



Competing for Collaboration on Particle Accelerators in the Multipolar Cold War World

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This article explores the entanglement of scientific collaboration and Cold War geopolitics through the lens of four major particle accelerator complexes: CERN (Europe), JINR/Dubna and IHEP/Serpukhov (Soviet Union), and NAL/Fermilab (United States). Despite their scientific significance, the origins and evolution of their exchange programs remain understudied. Moving beyond the conventional East-West binary, we adopt a multipolar framework to analyze how these four institutions forged enduring collaborations. From the first decade of the Cold War through the 1970s détente, bilateral agreements enabled the growing flow of personnel, equipment, and knowledge between CERN, JINR, Serpukhov, and Fermilab, thereby crossing national borders and ideological divides. These institutions operated strategically within the contested arena of the Cold War constellation, where competition for scientific leadership paradoxically fostered collaboration. Although plans for a joint global accelerator remained unrealized, our analysis highlights how international collaboration evolved into a nuanced, multilevel, and multipolar interplay—one that was shaped as much by scientific ambition as by persistent asymmetries and power dynamics.

Key words: Cold War; East-West; Particle accelerator; High-energy physics; Science diplomacy; Multipolarity.

Since 2022, Russia and Belarus have been excluded from collaborations with the European Organization for Nuclear Research (CERN), in accordance with UN sanctions imposed following their military aggression against Ukraine, an associate member of CERN.¹ This suspension of scientific exchange, driven by strong international political will, has drawn renewed attention to the intersection of science and diplomacy. At the same time, it exposes a notable gap in the historical literature: Although existing scholarship has illuminated the high degree of East-West exchange in physics during the Cold War, the origins, evolution, and expansion of international accelerator collaboration agreements remain

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underexplored. This article addresses that gap by analyzing the formation of key exchange programs from the first decade of the Cold War to the 1970s *détente*.²

International tensions and warfare have long shaped the possibilities, opportunities, and limits of scientific collaboration. During the Cold War, such exchange frequently persisted despite major conflicts, including the Warsaw Pact's invasion of Czechoslovakia in 1968.³ A decade later, the East-West exchange programs at CERN were put to the test when staff questioned their continuation in response to the imprisonment of Soviet physicist and human rights activist Yuri Orlov.⁴ Scientific exchange can serve as a bridge between nations or ideologies, but it is historically contingent and subject to change under shifting state regimes and diplomatic conditions.

Paradoxically, in some scientific domains, the Cold War encouraged rather than prevented exchange across the Iron Curtain. A growing body of scholarly work shows that meetings like the 1955 Atoms for Peace Conference famously opened pathways for international collaborations, contributing to the growth of the number of scientific partnerships. The same holds true for several grassroots initiatives, including the Pugwash movement to prevent atomic warfare. The trend towards exchange was particularly pronounced in scientific domains regarded as humanitarian and civilian. Yet exchange was far from a neutral asset: it was both a vital resource for research communities to share knowledge and a strategic instrument used by governments to showcase superiority or maintain international asymmetries—at times serving as a channel for covert operations, including espionage on a partner's research and technology.⁵

The most common rationale for creating and fostering East-West exchange during the Cold War was what contemporary scholars term “science diplomacy”: the governmental use of scientific collaboration or scientific advisory work to advance national interests abroad or support international initiatives.⁶ To better understand how scientific exchange works in politically charged environments, we examine agreements that enabled access to particle accelerators across the Iron Curtain. In doing so, we focus on the motivations that shaped these agreements. Our focus is on four large accelerator complexes that all emerged in the first three decades after the Second World War: CERN, founded in Geneva, Switzerland, in 1954; the Joint Institute for Nuclear Research (JINR), founded in Dubna, Soviet Union, in 1956; the Institute for High Energy Physics (IHEP; also called Serpukhov), founded in Protvino, Soviet Union, in 1963; and the National Accelerator Laboratory (NAL; soon named Fermilab), founded in Batavia, United States, in 1967. We trace the origins, consolidation, and stabilization of their exchange programs, viewing the latter as the foundation for expanding collaborations that endured through the collapse of the Soviet Union in 1991.⁷

Geopolitical tensions led governments to back the development of ever more powerful accelerators to assert scientific leadership. Within the emerging network of international scientific exchange, this sparked a competition for collaboration, as nations aimed to secure their scientific edge through strategic partnerships. By

examining this dynamic for four key accelerator complexes, we present what happened within the high-energy physics research community beyond governmental patronage.⁸ Put differently, narratives on the rise and fall of the Superconducting Supercollider (SSC) in the last years of the Cold War make clear that competition between accelerator physics institutions did not simply mirror political rivalries. It was the European accelerator complex CERN, rather than any Soviet counterpart, that worried American enthusiasts of the SSC about losing their leadership.⁹ But apart from recognizing the success CERN scientists achieved, for instance with the 1984 Nobel Prize for the discovery of the W and Z bosons,¹⁰ many of the reasons that made the European organization a strong rival in high-energy physics remain largely unexplored.

We aim to add nuance to the literature on East-West scientific exchange by incorporating Europe's role as a third actor.¹¹ To this end, we adopt an interpretation of the Cold War that transcends the conventional binary framework of superpower conflict.¹² Building on scholarship that emphasizes "continuous interaction, interconnectedness, discourse, and the flow of ideas,"¹³ we challenge the limitations of the traditional bipolar perspective centered on the division along the Iron Curtain. Crucially, we highlight the strategic importance of competing for collaboration within a *multipolar constellation*. Historians of science have used the concept of multipolarity to describe the distinct interests of the non-aligned movements and the emerging "Third World," as well as how these newly independent nations influenced the UN knowledge system in the 1970s.¹⁴ However, more work is needed to understand how, prior to the 1970s and beneath the polarization between the United States and the Soviet Union, national interests frequently failed to align even within the same bloc. The pursuit of collaboration by physicists underscores the internal fragmentation within both the West and the East, challenging assumptions of cohesive geopolitical interests.¹⁵

Drawing on archival records from several countries,¹⁶ we argue that the exchange programs established between CERN, JINR, Serpukhov, and Fermilab were the result of both alignment *and* rivalries. While the most visible aspects of collaboration involved an intensive flow of correspondence and materials and the travel of physicists, these exchanges were far from resembling the natural flow of water rushing downstream once barriers were removed. A more fitting metaphor is that of a pumped, energy-demanding system, where diplomatic and trade channels were used as pipelines. Opening these channels was possible through coordinated efforts involving physicists and officials. Thus, in addition to examining multipolarity as a *horizontal* international dynamic, we also consider *vertical* interactions within states, specifically those between laboratory directors and government agencies. The alignment of institutional and political interests had to be actively negotiated. Governmental agendas and scientific rationales did not always align, but their synchronization proved critical in enabling scientific collaboration. Employing a multipolar analytical framework that accounts for

multilevel dynamics offers a clearer understanding of how accelerator exchange programs were forged and enacted.

Opposing the American Monopoly

Simone Turchetti has shown that the US influence on European scientific affairs after the Second World War was not without resistance. Nowhere was the entanglement of physics with geopolitical tensions, struggles against hegemony, and movements for national independence more evident than in France.¹⁷ Here, the influential left-wing scientists couple Irène and Frédéric Joliot-Curie chose to pursue collaboration with the East rather than the West, a decision that later proved decisive for the development of the multipolar accelerator network we explore.

The Joliot-Curies' fate paralleled that of the French Communist Party (PCF) of which they were associates. While the PCF was the largest party of the postwar governing coalition, the couple played an outsized influence on atomic policy. Tina Crossfield has noted that they “controlled every piece of serious nuclear work in France.”¹⁸ In 1945, Irène became Commissioner for Atomic Energy and, in the following year, director of the Radium Institute in Paris. Frédéric's rise to political prominence happened during France's liberation. In 1944, he headed the *Centre National de la Recherche Scientifique* (CNRS). A year later, he became High-Commissioner for Atomic Energy, which made him the leader of the French atomic energy program and its delegation to the UN Atomic Energy Commission (UNAEC). However, much like France's political establishment, its scientific community was deeply divided after the war, and this division led to the waning influence of both the PCF and the Joliot-Curies at a time when tensions between the Soviet Union and the United States increased. Underlying the division were arguably considerations about France's position in the world. A conservative anti-Communist and anti-Gaullist faction portrayed it as a weak and unstable country on the verge of a communist insurrection—which could be prevented by US help. On the other hand, a coalition of Gaullists and former Resistance fighters advocated for the vision of a strong, sovereign France. They contemplated agreements with the Soviet Union to assert French power.¹⁹

The communists were also patriots. In that spirit, Frédéric Joliot-Curie aimed to forge an alliance to help his country establish itself as a nuclear power, countering efforts to maintain the Anglo-American monopoly on uranium and thorium ores outside the Soviet Union.²⁰ In June 1945, during a visit to the Soviet Union, he proposed cooperation in nuclear research when it was still a clandestine endeavor, prior to the dropping of atomic bombs on Japan. Joliot-Curie offered to share information on the secret Manhattan Project obtained through former students in Canada and the United States. Lavrenty Beria, in charge of the Soviet atomic bomb project, informed Iosif Stalin that “from the conversation with Prof. Joliot it became clear that he envisages co-operation with Soviet scientists in the

form of mutual consultation, and utilizing our raw materials, monetary subsidies and material aid to carry out these works in France according to a common plan with the USSR.” However, since Joliot-Curie could not share any information not already obtained elsewhere, Beria suggested a limited exchange through the Soviet Academy of Sciences.²¹

Later, perhaps due to the moderate success of his initiative and given the need to secure access to uranium, Joliot-Curie made a similar proposal to the Belgians. The colonized Belgian Congo had some of the largest known uranium ore mines, and through secret commercial contracts signed during the war, the Belgian government granted access to the United Kingdom and the United States. Joliot-Curie’s proposal, therefore, put him at odds with the US State Department’s interest. In January 1947, Alan G. Kirk, Ambassador to Belgium, warned his Undersecretary of State, Dean Acheson, that the “avowed Communist” leveraged his “*réclame* family name” to garner support for exchange in nuclear physics. He stressed that Joliot-Curie had claimed “Western European scientific talent [was] quite capable [of] paralleling our successes in [the] field of atomic energy in all its aspects.”²²

Joliot-Curie’s proposal of a Franco–Belgian collaboration did not go unnoticed in the United States, and it resonated with Belgian scientists and left-leaning politicians, placing pressure on Prime Minister Paul Spaak. His cabinet members began to question whether “Belgium’s interests do not require real research in [the] atomic energy field, including active experimentation with uranium from Congo sources.”²³ Rumors of the secret treaty reached the press, making the public aware that the United States and Britain were acquiring the entire Belgian uranium production.²⁴ To mitigate criticism, Spaak pleaded with the US government to consider collaboration with Belgian scientists on research on the utilization of atomic energy.²⁵ Now US Secretary of State, George Marshall, intervened. Initially, he was firm in his refusal, claiming that the Atomic Energy Act of 1946 made it unlawful to exchange information.²⁶ However, the State Department was compelled to reconsider. On April 15, Kirk warned Marshall that “the Communists have had considerable success in building up Joliot-Curie as [a] man who knows most atomic ‘secrets’ and who will gladly work with Belgians (and Belgian uranium) in developing nuclear industrial power.”²⁷ Kirk proposed taking an offensive approach by discrediting Joliot-Curie’s reputation, a delicate task for which “American scientists would be in a better position than we to pass on both its practicability and best methods.”²⁸

The State Department formulated its response during the implementation of the Truman Doctrine. In 1947, this policy played a pivotal role in excluding communist parties from governing coalitions in Belgium, Italy, the Netherlands, Luxembourg, and France, consolidating American hegemony over Western Europe.²⁹ Also, the stance concerning the exchange with Belgium was changed. On May 14, 1947, Marshall informed Spaak that the State Department and the US Atomic Energy Commission (AEC) were determining the extent to which the

Atomic Energy Act permitted cooperation.³⁰ However, it would be difficult to make “arrangements for exchange of research findings if the Belgian research centers were penetrated by Communists... [C]ould there not be more vigilance by the government on this score now that the Communists are out of the government?” Marshall also suggested stirring “more concern in the press and parliament about Communist influence in the research program and Communist motives in agitating the question of the disposition of Congo ore.”³¹ As with the Marshall Plan funds for European economic recovery, the State Department leveraged scientific exchange to restrain Communist influence in Europe. This effort to use atomic research to advance foreign policy goals abroad needs to be seen in the context of Frédéric Joliot-Curie’s agitation.

Meanwhile the political situation in France changed drastically. On May 5, 1947, the PCF was expelled from the governing coalition, but Joliot-Curie’s scientific stature made it difficult to remove him from office. Marshall concluded that it was not practicable to debunk his scientific reputation, but his Communist ties could be stressed.³² The rising anti-communist atmosphere made Joliot-Curie’s position as High Commissioner of Atomic Energy increasingly untenable. He was finally ousted in May 1950 after declaring that “truly progressive Communist scientists will never give a scrap of their science to make war against the Soviet Union.”³³ Kirk, now US ambassador to Moscow, rejoiced at this turn of events. “Judging by [the] tenor and content [of] articles currently appearing [in] Pravda Izvestiya et al.,” he wrote to the new Secretary of State, Dean Acheson, the “French Government has dealt [a] resounding blow in expelling Professor Joliot-Curie from [the] post in atomic research.”³⁴

The dismissal of Joliot-Curie boosted his political profile in the Soviet Union. The presidium of the Soviet Academy of Sciences submitted a motion to the Central Committee (CC) of the Communist Party of the Soviet Union (CPSU), protesting the “barbaric prosecution” of Joliot-Curie in France and requesting help in publicizing an open letter in his defense.³⁵ Internationally, Joliot-Curie became a leader of the burgeoning peace movement and maintained close ties with Soviet scientists. At home, he and his wife intensified a campaign for a national laboratory. But their efforts clashed with Washington’s vision of Europe. Since 1948, several proposals for a multinational European laboratory had been formulated. This idea gained momentum after US physicist Isidor I. Rabi discussed it at a UNESCO meeting in 1950. Rabi also endorsed the new report *Science and Foreign Relations*, an outline of the use of science to advance US objectives, including containing the spread of communism in Europe.³⁶ Based on Rabi’s proposal, which bore a striking resemblance to the US laboratories, the idea for a European accelerator complex was specified at a meeting of consultants at UNESCO in May 1951.³⁷

The 1950s witnessed at least two conflicting visions of European integration: those on the far left sought to resist the US monopoly and were willing to cooperate with the Soviet Union, while others believed that Europe could build a

strong front against communism.³⁸ Against this backdrop, the official French consultants were among the strongest supporters of what was evolving into the European Organization for Nuclear Research (CERN).³⁹ However, in the context of anti-communist agitation and rumors of US patronage of CERN, its advocates became the target of fierce criticism in the French communist press in 1953. CERN was depicted as a brainchild of the *Science and Foreign Relations* report and as part of efforts to place European talent at the service of the United States. Pierre Auger, the UNESCO consultant who orchestrated the meetings for establishing CERN, was labeled an international agent promoting the multinational laboratory at the expense of national laboratories—most notably the high-energy physics facility under construction in Orsay led by Irène Joliot-Curie.⁴⁰ *Physics Today* denied US involvement in plans for CERN, while reporting that the Geneva left-wing party was seeking to prevent its construction through a referendum.⁴¹ The referendum failed, and twelve European states reached an agreement on the construction of a European accelerator complex—including a proton synchrotron with a beam energy of 24 GeV. Importantly, CERN's status in neutral Switzerland was reinforced by omitting the term "Europe" from the membership description.⁴²

Meanwhile, Soviet physicists urged their leaders to scale up the use of atomic energy facilities for political purposes. Their initiative included organizing a conference with guided tours for foreigners in July 1955 and sending a large delegation to participate in the UN Atoms for Peace Conference in Geneva a month later.⁴³ When CERN staff and Soviet physicists met there, both camps were openly considering potential collaboration. According to William Owen Lock, a British physicist who would later oversee the exchange programs at CERN, these informal chats laid the foundation of East-West collaboration.⁴⁴

The Franco-Soviet Affair

In 1955, the "peaceful atom" became a cornerstone of Nikita Khrushchev's and Dwight Eisenhower's rhetoric of coexistence, paving the way for exchange.⁴⁵ The emphasis on their agreements has significantly shaped historiography. Largely overlooked is the Franco-Soviet exchange as a spearhead of initiatives, illustrating a significant dimension of multipolarity. Furthermore, the partisan struggles that shaped CERN also played out in the creation of the Joint Institute for Nuclear Research (JINR) in Dubna. The latter soon partnered with the Institute of Nuclear Physics and Radioactivity in France and later with CERN.

CERN was created amid a tense geopolitical climate. Notably, the 1955 Atoms for Peace Conference sparked interest among socialist countries in potential participation at the Geneva laboratory. In principle, this was feasible because of the removal of the term "Europe" from the membership description. While physicists from France and Yugoslavia, both CERN member countries, invited Poland to consider joining, an informal proposal by the Soviet delegation was rejected. This can be attributed to CERN's decision to suspend the admission of

new members for at least two years, but at the time, the conflicting messages fueled suspicions that Poland was invited to sow divisions in the Eastern Bloc.⁴⁶

A blend of mistrust and determination to foster international exchange played a key role in the creation of the JINR. In November 1955, Boris Vannikov, Deputy-Minister of Medium Machine Building (responsible for atomic weapons and energy), presented a proposal to the Central Committee for establishing an Eastern Institute for Nuclear Research. He asserted that the US administration had orchestrated the making of CERN, echoing earlier criticism of European communists. Vannikov argued that, although the United States was not part of CERN, there was “no doubt that in the future it will make extensive use of the results of the work of this laboratory and the European scientists working in it.” He thought paying for materials and facilities would not guarantee access for the Communist bloc in the event of “possible complications,”⁴⁷ implying that host state Switzerland might not be neutral.

The Ministry advised against Soviet participation and instead proposed an independent Eastern institute. The envisioned laboratory could then “enter into an agreement with the European Laboratory for Nuclear Research on the exchange of scientific data and provide the employees of the European Laboratory and the Eastern Laboratory with the opportunity to work at each site.”⁴⁸ Two months later, in January 1956, the Central Committee issued a final resolution recommending the invitation of Poland, Czechoslovakia, the German Democratic Republic, Hungary, Bulgaria, Romania, Albania, China, North Korea, Mongolia, India and Yugoslavia to a meeting on the organization of the new institute. The resolution authorized the integration of formerly classified military facilities in Dubna and approved the construction of facilities and residential buildings. Concurrently, a collider capable of accelerating protons to 10 GeV was completed at the existing site, placing the institute at the forefront of the ongoing race for the world’s most powerful accelerator.⁴⁹

The memoranda sent to the Communist parties of the invited countries reiterated concerns about US influence on CERN and warned of the precarious position socialist countries would face if they joined.⁵⁰ Interestingly, this warning was omitted from the invitation extended to CERN member state Yugoslavia, where Josip Tito sought to build an independent model of socialism. At the same time, all invitees were reminded that establishing an Eastern institute did not imply isolation. On the contrary, its powerful accelerator would provide a secure basis for collaboration with the capitalist West.⁵¹

In March 1956, representatives from eleven socialist countries convened in Moscow to draft an agreement for the planned institute (see figure 1). Neither India nor Yugoslavia sent delegates, illustrating their strive for non-alignment.⁵² As had been the case with CERN’s decision to omit “Europe” from its Convention, meeting participants voted against including “Eastern” in the institute’s name. The assembly proposed to replace “Eastern” with “International” to diminish the opposition between East and West and facilitate easier access for



Fig. 1. Representatives of the eleven JINR founding members gathered in Moscow on March 26, 1956. Source: <https://www.jinr.ru/history/>.

other states.⁵³ In the end, the Central Committee named it “Joint Institute for Nuclear Research,” and the eleven member states signed the agreement on March 26, 1956.⁵⁴ In a clear indication that the move was as much diplomatic as it was scientific, the request for authorization to publicize the agreement was signed by the Minister of Medium Machine Building, Avraami Zavenyagin, and the Minister of Foreign Affairs, Andrei Gromyko. It received the unreserved approval of the Central Committee.⁵⁵

The new Dubna institute was intended to integrate scientists from socialist countries while simultaneously reinforcing Soviet hegemony. It functioned as a showcase of socialism and became the hub for exchanges with countries seeking to break free from US influence. Notably, Frédéric Joliot-Curie was among the first foreigners allowed to work at Dubna, when it was still a secret facility under military control.⁵⁶ As the JINR was being established, the support for the French was scaled up. Irène Joliot-Curie also worked to forge ties between the Curie Laboratory of the University of Paris and the Soviet physical and chemical institutes. In February 1956, she requested permission for a group of her collaborators to familiarize themselves with the Soviet institutes and asked to send someone to work at the synchrocyclotron in Dubna. These visits were meant to benefit the reorganization of her laboratory into the Institute of Nuclear Physics and Radioactivity, equipped with a 150 MeV synchrocyclotron.⁵⁷

The decision of the Central Committee surpassed her expectations. Her request received unreserved approval at all levels of Soviet bureaucracy. The Academy

incorporated the group visit in its “internationalization plan,” and an employee of the Curie Laboratory worked for a year in Dubna on its payroll.⁵⁸ Thus, although France was not a member country, a French scientist was employed at the JINR even before most Eastern countries, shortly before it officially launched activities in September 1956. JINR and France formally agreed to exchange physicists and accelerator experts for short visits and extended this agreement to more French institutions. The importance of the Communist couple in establishing exchange remained recognized even after their deaths.⁵⁹

Orchestrated by high-ranking scientists, politicians, and diplomats, the Franco-Soviet affair was designed to strengthen ties. As the collaboration broadened, it involved French delegates to the CERN Council, such as Francis Perrin, who had succeeded Joliot-Curie in 1950 at the CEA. These interlinked efforts would soon ensure a significant degree of coordination between French and Soviet laboratories with CERN. In this multipolar constellation, the Franco-Soviet exchange was setting the pace well into the next decade.

Formal negotiations on the potential exchange between CERN and JINR began in 1959.⁶⁰ In June 1960, John Adams, interim Director-General of CERN, was authorized to arrange the exchange of research personnel. Adams approached Dmitry Blokhintsev, JINR’s first director, informing him that the Swiss government would grant visas.⁶¹ A month later, three JINR physicists arrived at CERN for their six-month assignments, working at the accelerators and in theoretical studies.⁶² The delay in implementing the exchange until that year, despite earlier encounters, was caused by CERN’s decision to focus on completing the Proton Synchrotron (PS), which became operational in 1960 with a range of 28 GeV, surpassing the JINR machine. In 1961, Blokhintsev and Adams agreed to continue the exchange. Sam Dakin, the CERN Director of Administration, invited staff to apply. He soon informed Blokhintsev that there was interest in research on accelerator principles and design, including bubble and track chamber technologies. As a result, two CERN researchers traveled to Dubna for a six-month stay.⁶³ A year later, CERN visitors to Dubna, accompanied by families and required to have basic knowledge of Russian, worked in the theory department, at the synchrocyclotron and bubble chambers, in data handling, spark chamber techniques, and nuclear physics.⁶⁴ In 1966, when the exchange was deemed useful,⁶⁵ plans were simultaneously developed to expand collaboration to a new Soviet laboratory, which was building a proton synchrotron twice as powerful as the one at CERN.

Collaboration Made in Switzerland

In March 1958, the Central Committee approved the creation of a large accelerator and selected a location near Serpukhov, which developed into the science city of Protvino. Construction began in January 1960, when CERN prepared to launch the world’s most powerful accelerator. The Serpukhov initiative underscores the

Soviet drive to remain at the forefront of high-energy physics and the aim of establishing a new benchmark outside its existing multinational arrangement at the JINR in Dubna. In 1963, Anatoly Logunov, a theoretician of the JINR, became the first director of what was now called the Institute of High Energy Physics (IHEP), an accelerator complex controlled by the Soviet State Committee for the Utilization of Atomic Energy (SCUAE).⁶⁶

Four years later, the IHEP U-70 Synchrotron set a new global energy record of 76 GeV. In Europe, the significance of this achievement prompted efforts to expand the existing collaboration from Dubna to Serpukhov, incorporating joint work that required the transport of materials to the East.⁶⁷ France once again took the lead in these initiatives, with CERN following closely behind. This dynamic was further facilitated by Switzerland's pragmatic approach to export controls. As Bruno Strasser has discussed, Swiss neutrality as a cornerstone of political identity enhanced CERN's image as a neutral entity, thereby strengthening its internationalist credentials.⁶⁸ This dual-neutral stance allowed for strategic flexibility in expanding the existing exchange programs.

The prominence of France's role was no accident. Under Charles de Gaulle's presidency (1959–1969), France pursued a bold foreign policy aimed at strengthening ties with the Soviet Union. At the same time, tensions with the United States grew, fueled by disagreements over NATO and the escalating US intervention in France's former colony, Vietnam.⁶⁹ These tensions impacted scientific collaboration, as the US imposed stricter visa policies for French physicists, reversing the previous relaxation following the 1955 Atoms for Peace initiative. Victor Weisskopf, Director General of CERN from 1961 to 1965, described the situation as a "little cold war between France and the USA [that had] taken some forms which [were] definitely detrimental to international scientific collaboration."⁷⁰

Meanwhile, de Gaulle carved a joint declaration with Soviet head of state Nikolai Podgorny on cooperation in foreign affairs, science and technology. They aimed to partner the two countries in atomic and space research, other technological fields, and the production of color television.⁷¹ For the European correspondent of *Science*, this decision gave "the world an elegant lesson in how to use cooperation in science and technology as a tool of diplomacy."⁷² In June 1966, as part of this broader decision, an agreement was signed on collaboration in physics which gave the French access to the U-70 Synchrotron at Serpukhov. A "French village" was even built there to settle more than a hundred researchers and families. The deal included a liquid-hydrogen bubble chamber called "Mirabelle" to be produced in France and shipped to the Soviet Union.⁷³

Correspondence indicates that the French delegates to the CERN Council, particularly Perrin, were committed to involving the European laboratory in the emerging exchange. At the same time, the physicists sought contact: At a conference in Dubna in 1964, Weisskopf met Logunov to discuss potential future collaboration.⁷⁴ In June 1965, Weisskopf followed up by approaching the Chairman of the SCUAE, Andronik Petrosyants, to suggest extending the exchange

between CERN and JINR to the IHEP, “the completion of which is awaited by physicists all over the world.”⁷⁵ The Soviets, in turn, coveted innovative instruments. Roman M. Sulyaev, IHEP’s vice director, showed particular interest in a radiofrequency proton-separator that had debuted at CERN only a month before.⁷⁶

In August, the laboratories’ directors discussed options, while a Soviet delegation came to Paris to negotiate the French bubble chamber. In December, his last month as CERN’s head, Weisskopf sent the official proposal for collaboration to the Soviet Union.⁷⁷ In addition to the scientific merits, CERN’s managers saw diplomatic advantages. Gilberto Bernardini, Italian member of the CERN Science Policy Committee, considered the endeavor “of a political rather than scientific nature,” revealing how much hope he projected on science as a tool to improve international relations while likewise considering that it was difficult to convince his authorities of the need to invest a large sum if the physics return was “doubtful.”⁷⁸

The French physicist Bernard Gregory, an expert on bubble chambers and Weisskopf’s successor as Director-General from 1966 to 1970, carried out the plans.⁷⁹ He led negotiations for a collaboration that went far beyond the scope of the previous CERN-JINR agreement. It covered the supply of the ejection system, including the separator, but also included visits, data exchange, mixed teams, and joint technical studies. Although the agreement stipulated that the collaboration would span five years from the initial satisfactory operation of the CERN instruments in Serpukhov, the actual collaboration began immediately. Mixed teams had to work together to construct and test the new radiofrequency proton-separator so that the Soviet specialists could acquire essential methodological and analytical expertise.⁸⁰ In 1970, at the peak of preparation, Gregory argued that the presence of Soviet physicists at CERN was crucial for them to understand how to operate the apparatus.⁸¹ This reliance on tacit knowledge implied that the success of the exchange depended on a flow of experts through the Iron Curtain. The decision to establish such an expensive collaboration meant that scientists and governments were willing to navigate through situations that, in the late 1950s, had discouraged the Soviet Union’s involvement in CERN.

An attentive look at the process of shipping equipment from Geneva to Serpukhov sheds light on how much scientists and officials were willing to circumvent hurdles created by the Cold War. Their exchange faced the US Export Control Act of 1949 and regulations overseen by the Coordinating Committee for Multilateral Export Controls (CoCom). CoCom, with headquarters at a secret address in Paris, oversaw the day-to-day execution of export control, which Western European countries had to accept to receive Marshall Plan funding. CoCom restricted or even prohibited the exports of manufactured goods to the Eastern Bloc, especially to prevent the Soviets from acquiring know-how through reverse engineering. Yet, as CoCom restricted access to sales markets, Europe was

generally reluctant to cooperate, including Switzerland—a notorious violator of embargoes.⁸²

Indeed, Swiss officials demonstrated considerable goodwill in overlooking or relaxing the interpretation of their regulations to facilitate the shipment of materials and instruments eastward. In 1948, they considered that “*If* export licenses were subject to conditions restricting re-export by the country of purchase (such as a ban on re-exporting to Russia and other Eastern states for all goods purchased from America) and *if* an inspection in Switzerland could not be averted,” there was a necessity for proposing a classification specifically for re-export. Furthermore, only goods in an unprocessed state were considered subject to an export ban.⁸³ CERN would benefit greatly from the flexible interpretation of its host state as it only had to undergo self-declaration when shipping materials to laboratories in the Soviet Union.

Only in the 1970s détente did the legal framework for trade across the Iron Curtain ease. Prior to this, pressures on the CoCom system had increased markedly, making the discussion about the shipping of CERN material part of a broader trend towards liberalization of export control—with the Swiss joker to be played. For a shipment of materials to Dubna, CERN secured the export license by demonstrating that the transfer did not fall under export restrictions, as the assembly costs and development work at CERN meant that the foreign components would only represent a small portion of the total value. As a result, the Swiss representative concluded that “an export license for this one-off shipment should be readily available.”⁸⁴ Similarly, for the collaboration with Serpukhov, there is no evidence of any reservations about the list of equipment to be shipped in June 1968, which CERN submitted to the Swiss Federal Political Department. It eased restrictions, but Switzerland was not alone in its willingness to sidestep CoCom regulations for the sake of collaboration. Other CERN members with materials in Geneva quickly agreed to send them to Serpukhov as well.⁸⁵

Sustaining a flow between Geneva and Serpukhov was no minor bureaucratic achievement. The CERN directorate worked closely with Swiss officials to obtain the necessary export licenses. Sorting the list into equipment made in Switzerland, equipment of foreign origin without import restriction, and equipment of foreign origin imported with restrictions,⁸⁶ their discussion focused on the latter two categories of commercially produced components. Twenty-two components had come from France, Sweden, Germany, Switzerland, the UK, and the United States.⁸⁷ The CERN directorate contacted European member states and the US Department of Commerce to get the necessary export permissions. European countries gave the green light,⁸⁸ but the United States blocked the export of a laser and similar equipment for which Serpukhov staff had to find a replacement.⁸⁹

Despite completing the first joint experiments by the end of 1968, both sides initially sought to carry out the equipment transfer discreetly (see figure 2). However, once its public relations potential was recognized, the large-scale shipment of scientific instruments became a regular feature in the *CERN Courier*.⁹⁰ In



Fig. 2. Materials packed at CERN for shipment to Serpukhov in June 1968. Courtesy © CERN, Reference: 259-6-68.

June 1971, as the fast ejection system was installed at Serpukhov, the newly appointed CERN Director-General, Willibald Jentschke, described the collaboration as “very successful.”⁹¹ Importantly, beyond its scientific achievements, the partnership allowed CERN to position itself as internationally engaged and independent.

The formal inauguration of the CERN-IHEP collaboration took place on June 8, 1972. The event was attended by several Soviet officials and distinguished scientists, including Andronik Petrosyants and Anatoly Logunov. The CERN delegation was led by Jentschke. He was accompanied by Yves Goldschmidt-Clermont, a Belgian physicist. Newly declassified files reveal that in 1950, Goldschmidt-Clermont was initially denied entry to the United States due to suspected communist affiliations. However, in light of ongoing negotiations with the Belgians over access to uranium, US officials resolved the matter discreetly and he could visit several laboratories.⁹² In 1953, Goldschmidt-Clermont became head of

instrumentation at CERN. Two decades later, he was entrusted with overseeing the practical aspects of East-West exchange as a senior researcher.⁹³

The inauguration ceremony in Serpukhov emphasized the importance of scientific collaborations to improve East-West relations. In his speech, Jentschke highlighted the progression from attending conferences to conducting joint laboratory work as a way to better understand each other's methods.⁹⁴ Petrosyants reflected on the positive reception in the Soviet press and noted the collaboration's political significance, paralleling US President Nixon's current visit to the Soviet Union.⁹⁵ Indeed, the United States was always in the picture, even if at times only as the faint color in the background. It did not take long for the United States, a dominant force in high-energy physics, to catch up.

American Jealousy

The period of increasing East-West exchange is commonly called the "long thaw." While in atomic energy research, including high-energy physics, its beginnings are often associated with the 1955 Atoms for Peace campaign, a significant deepening of contacts occurred only after bilateral agreements were signed in 1959. That year, CERN and JINR arranged their first staff exchange, while the US and USSR signed a formal memorandum under the Lacy-Zarubin agreement on cultural exchange. It specified mutual visits and the exchange of information between scientists across a broad range of topics.⁹⁶ Despite this, the US-USSR exchange remained limited, not only due to incidents such as the U2 spy plane and the Cuban Missile Crisis but also because of strict reciprocity demands. Both sides insisted on equal treatment and benefits, requiring the exchange of equivalent specialists and resources, as well as a balance in the flow of information. In contrast, Euro-Soviet collaboration evolved more dynamically, benefiting from greater flexibility. It was in this context that the newly established National Accelerator Laboratory (NAL) in Batavia, Illinois, was conceived as a key site for East-West encounter, intended to promote scientific rapprochement between hostile countries. Institutionalized as Fermilab in 1974, its non-classified framework and international outlook made it particularly conducive to facilitating such exchanges.⁹⁷

As early as 1962, the AEC identified the importance of creating a new accelerator to allow active participation in foreign scientific projects. Such a facility would "provide a focus for the future American efforts in pushing back the frontiers of the important field," and more importantly, "[we] could enter into a formal international arrangement with laboratories such as CERN and DUBNA."⁹⁸ But conflicts over the optimal location for the proposed 200 GeV accelerator, coupled with disagreements on the design priorities, were compounded by the reciprocity restrictions and the prevalence of classified areas within existing US laboratories. These factors collectively contributed that Europe maintained a lead in collaboration with the Soviets. In this context, CERN's

exchange program sparked what can be described as American jealousy—a drive to bypass European physics. This impulse reflects a revised form of American hegemony, as identified by John Krige for the earlier Cold War period.⁹⁹

Europe's favorable position was reinforced by technical assessments suggesting that their collaboration with the East could yield results ahead of comparable US efforts. In November 1965, even before CERN had formally proposed collaboration with the IHEP, Bryan Montague, leader of CERN's separator project, argued that the Serpukhov design "could put CERN physics in the energy range of the first experiments with the USA 200 GeV machine before this accelerator starts operation."¹⁰⁰ On the other hand, illustrating both strategic multipolarity and the strong interest among physicists in expanding the number of available accelerators, CERN and US physicists maintained close contact as they pursued their respective objectives. While drafting the collaboration agreement with Serpukhov in 1967, CERN's Director-General Gregory informed Wolfgang Panofsky, director of the Stanford Linear Accelerator Center (SLAC), about the ongoing negotiation.¹⁰¹ In his reply, Panofsky suggested they stay informed on each other's progress in establishing collaboration but proceed independently.¹⁰² Soviet physicists, with their impressive Serpukhov design, were in a strong negotiating position, benefiting from a seller's market and securing favorable terms with both European and American peers.

Although collaboration with the Soviets developed more slowly on the American side, this lag did not reflect a lack of interest among physicists. In 1964, at a conference where Weisskopf and Logunov discussed potential CERN-IHEP exchanges, Maurice Goldhaber, director of the US Brookhaven National Laboratory, also spoke with Logunov, who expressed interest in sending researchers to the United States.¹⁰³ Momentum continued to build: after a meeting in 1966, the AEC Chairman Glenn Seaborg proposed a joint US-USSR experiment at the Serpukhov accelerator to search for massive particles. The proposal was well-received by the managers of the major US laboratories.¹⁰⁴ However, by this time, with the CERN-JINR collaboration flourishing and the CERN-IHEP partnership gaining traction, the Soviets increasingly saw Europe as a more advantageous partner. As a result, their enthusiasm for expanding ties with the US waned, revealing how collaboration was shaped by shifting calculations of institutional opportunity and strategic leverage.

Witnessing this development—and with the Serpukhov accelerator nearing completion, pending only the arrival of innovative data collectors from Europe—the Americans intensified their efforts to reestablish their previous monopoly. Scientific collaboration often operated alongside, and was even enabled by, political competition. Leading physicists leveraged national rivalries to advance the goals of their communities, illustrating that collaboration was not the antithesis of competition but deeply entangled with it, as rivalry helped secure domestic funding. Indeed, recognizing the need to provide its national community with access to the evolving multipolar exchange, the US government envisaged

transsystemic exchange as a key function of the new accelerator facility. In 1966, the NAL proposal was finalized, with plans for the accelerator to reach a new benchmark: US President Lyndon Johnson's budget allocated funding for a Main Ring accelerator expected to reach the calculated 200 GeV—more than twice the energy of the Serpukhov design.¹⁰⁵ The realization of the Main Ring accelerator would mark a dramatic shift in the international high-energy physics community, prompting a reassessment of collaboration and access.

The approval of the NAL shifted the multipolar dynamic in favor of the United States and also provided strong incentives to pursue reciprocal access agreements with the Soviets. In 1967, AEC Chairman Seaborg claimed that closer collaboration would benefit both scientific advancement and humanity. He told Petrosyants that it was an ideal time to explore US participation in Serpukhov experiments. Seaborg's proposed arrangement resembled the CERN-IHEP agreement in its wording. Under this plan, joint research teams would be formed, with Americans contributing their expertise from operating accelerators like the 33 GeV alternating gradient synchrotron at Brookhaven. They would also provide equipment, which, after active Soviet participation in the development, would be shipped to Serpukhov.¹⁰⁶ The rationale also included strategic elements benefiting their new national effort. Paul W. McDaniel, Director of the AEC Division of Research, saw access to Serpukhov's higher energy levels as crucial for advancing US research, particularly in planning the 200 GeV accelerator in Batavia. The Soviets, in turn, sought access to this new powerful research complex, illustrating the careful balancing of mutual interests.¹⁰⁷

In November 1967, Seaborg reiterated interest in collaboration in another letter to Petrosyants. He proposed organizing a meeting to advance the collaboration and recommended that senior staff members be assigned to formalize the arrangements, ideally by May 1968. The negotiations then stalled for reasons not documented in our primary sources, and the meeting probably never occurred. That month, Goldhaber informally approached Logunov to reaffirm the strong interest of the laboratory directors in pursuing collaboration.¹⁰⁸ In April 1969, half a year after the invasion of Czechoslovakia had raised doubts about continuing exchanges with the Soviets in principle, CERN's leading theoretical physicist Léon van Hove offered an insider's perspective to the Americans, revealing European satisfaction with the collaboration with IHEP.¹⁰⁹ Indeed, negotiations between the United States and the Soviet Union resumed, though "no formal agreements [were] reached beyond commitments to follow up agreed items further with the domestic authorities."¹¹⁰ Despite similarities in the goal and content of the planned collaboration, this slow progress stood in contrast to the established CERN-IHEP agreement. US efforts were hampered by a more bureaucratic and security-restricted environment that complicated the negotiations, illustrating the impact of control restrictions on the domestic physics community.

The first documented long-term exchange in high-energy physics between the United States and the Soviet Union occurred in 1970, when six Americans spent

six months at Serpukhov.¹¹¹ Recognizing the importance of expanding this collaboration, officials from both governments signed an agreement on November 30, 1970, to establish a joint research project at Serpukhov and NAL. The *CERN Courier* celebrated this move, describing it as “evidence of the world-wide collaboration among high energy physics laboratories.”¹¹² Like the agreement between the IHEP and CERN signed three years earlier, the IHEP-NAL agreement was valid for five years, with the option of renewal should both parties agree. However, unlike IHEP-CERN, IHEP-NAL stressed reciprocity. Under the terms of this agreement, the Soviet Union supplied equipment and sent seven scientists with their families to the NAL for a year to carry out a joint experiment on proton-proton collisions. In return, the United States provided equipment and seven scientists to work at the IHEP. Research results of the collaborative efforts (planned for 1972) would be published as joint reports.¹¹³ The American NAL thus had the effect of partially shifting the center of gravity for exchange arrangements away from CERN, thereby diminishing the latter’s role as a key enabler for interaction between Western and Eastern research communities.

In fact, backchannel diplomacy continued to evolve. With the realignment of the multipolar exchange system among accelerator complexes during the *détente* of the early 1970s, a new form of hidden hegemony emerged in the West—less based on direct US control over European physics and more driven by anxieties about losing scientific leadership. American jealousy was not merely envy of Europe’s achievements but a fear of losing influence over a maturing European physics community that had become increasingly independent and successful in mediating East-West collaboration. In other words, while physicists generally valued collaboration for its epistemic benefits and access to cutting-edge infrastructure, US policymakers approached collaboration more instrumentally—as a tool to maintain preeminence. Collaboration was pursued to reinforce superiority within the physics hierarchy by shaping the terms of engagement in the multipolar accelerator race. American jealousy took a tactical form: the strategic downplaying of European-Soviet efforts and the bypassing of Western Europe in setting agendas. Precisely speaking, after reaching a preliminary exchange agreement with the Soviets, US authorities moved to propose a bilateral partnership that would outmaneuver Europe in what had become a contest over alignment.

In May 1970, initial discussions took place between the Soviet Academy of Sciences and the US National Academy of Sciences to explore a potential collaboration. Their proposal called for the creation of a study group to assess the prospects of joint designs for the next generation of accelerators. Crucially, the plan was drafted without input from European physicists. The mastermind behind this decision was Philipp Handler of the US National Academy of Sciences. Handler was annoyed that the Soviets and Europeans had been meeting annually since 1967 to discuss collaborative opportunities without American involvement—likely due to lack of a formal agreement. Only in September 1971, Americans were invited to these meetings, scheduled to take place in Morges, a town near

Geneva.¹¹⁴ What concerned Handler was CERN's plan to construct a 300 GeV collider, and he viewed a bilateral meeting between US and Soviet physics as a strategic response. This bilateral initiative, then, was not simply a diplomatic overture to stabilize partnership, it was designed to counterbalance Europe's growing relevance in high-energy physics.

When word of the proposed joint study group began circulating among researchers, it provoked concern. Weisskopf, a leading physicist and strong advocate of multilateralism, was particularly disturbed—though unaware that the initiative had originated not with the Soviets, as he assumed in his letters, but with Handler. For Weisskopf, the optics of the proposal was troubling. He criticized what he perceived as “Russian insistence on bilateral action,” warning that the exclusion of Europe, as represented by CERN, would be highly detrimental to the spirit of collaboration and opposed to past tradition.¹¹⁵ In reality, it was US officials who were attempting to redefine the structure of collaboration, privileging bilateralism with the Soviets as a means to reclaim influence over a transnational space that had increasingly slipped beyond their control.

American jealousy threatened to undermine the fragile multipolar balance. Yet the attempt backfired. Mstislav Keldysh, President of the Soviet Academy of Sciences, sent a sharp reply to Handler, rejecting the notion of a bilateral working group. He made it clear that the purpose of a meeting was merely to initiate the expansion of general exchange.¹¹⁶ Keldysh's position, while couched in diplomatic language, was likewise strategically calculated: by maintaining ties with both CERN and NAL, the Soviets could maximize their access and visibility. At the time, the Serpukhov accelerator still represented the pinnacle of prestige, functioning as a central hub for simultaneous experiments with Western partners. The Serpukhov design was the pivotal vertex of the triangular connection, also highlighting the imbalance between the Soviet facility and the multinational JINR at Dubna. However, the Soviet Union's privileged position in the accelerator domain was not to last. The construction of newer ones threatened to render the Serpukhov design obsolete and gradually shifted experimental activity away from Soviet territory.

A significant turning point came on March 1, 1972, when the NAL Main Ring accelerator reached 200 GeV, now establishing the United States as home to the world's most powerful accelerator.¹¹⁷ Meanwhile, after considerable delays, CERN was progressing with its plans to build a 300 GeV super proton synchrotron (SPS) beneath the soil of Swiss and French territory. As the center of attention shifted, Soviet interest in participation at the SPS followed suit, pivoting toward participation in future European programs.¹¹⁸ This paralleled the vision of an even bigger collaborative effort and the realization of its ultimate symbol: the world accelerator.

Towards Global Collaboration?

The vision of a world accelerator was a persistent aspiration among physicists from the late 1950s through the 1980s, embodying the idea of transnational scientific collaboration that transcended Cold War divisions. In 1960, following the Lacy-Zarubin agreement, Robert Wilson, who would later become the first director of NAL, spearheaded the initiative to establish such a device. Yet at that time, building an “even bigger monster,” as one CERN observer put it, was not seen primarily as a financial challenge. Rather, he noted, “the main breakthrough required is political.”¹¹⁹ This diagnosis would prove prescient. As Adrienne Kolb and Lillian Hoddeson have noted in their historical study on the world accelerator idea, the fundamental barrier to its realization remained political. A mismatch between physicists’ ambitions to push the energy frontier and governments’ focus on geopolitical gain obstructed the creation of a jointly administered facility. After strong momentum in the 1970s, the US rebranded the effort as the SSC, which was never completed.¹²⁰

This outcome was not yet foreseeable during the peak of *détente*, which fueled optimism. In 1974, while advocating for the world accelerator, Wilson, a politically astute and strategically minded administrator, articulated the broader implications of scientific collaboration in a letter to CERN Director-General Jentschke titled “An International Physics Laboratory Now.” In it, Wilson emphasized that, given science’s crucial role in fostering communication, a “truly international laboratory” would not only advance scientific projects, but also bring sociological and political benefits. Citing the initial steps taken through the CERN–JINR collaboration, Wilson proposed an ambitious merger of IHEP, CERN, and NAL into a unified World Physics Institute governed by a “super-council” overseeing its three branches.¹²¹ These three large-scale accelerator complexes, distributed across the United States, Europe, and the Soviet Union, were envisioned as the physical and symbolic pillars of scientific integration. Thus, the vision was selectively global: while those sites were central to Wilson’s plan, smaller facilities were not part of his considerations. This exclusion, especially of the whole Global South, reveals underlying asymmetries and institutional hierarchies.

Physicists earnestly discussed the world accelerator at the Morges meeting in September 1971. It was attended by 45 participants, equally divided between the United States, the Soviet Union, and Europe. The meeting concluded with the decision to form the joint study group to develop a report on the future of the field according to the outline discussed by Handler and Keldysh, but with European partners involved.¹²² When CERN managers discussed the plans half a year later, Giuseppe Salvini, Chairman of the European Committee for Future Accelerators (ECFA), seized the moment to re-emphasize the importance of the construction of a very high-energy machine. Weisskopf, another key supporter and now science advisor to CERN, stressed the importance of achieving global exchange,

suggesting that the European laboratory should not give up its “leadership in the field of collaboration between nations.”¹²³

Nearly four years later, after a conference in New Orleans in March 1975, Weisskopf summarized that the participation of Europe (and incidentally Japan) in the study group on a “world facility” would give “the opportunity to join activities that the Brezhnev-Nixon agreement may otherwise restrict to the USA-USSR regions.”¹²⁴ In doing so, he acknowledged the existing power imbalance while asserting a continued role for Europe as well as Japan. The Brezhnev-Nixon agreement reached in 1973 between the US President and the General Secretary of the Communist Party of the USSR was a shared agenda that encompassed nuclear disarmament, technological and cultural exchange, and collaboration in physics using the two nations’ accelerators. It also emphasized the potential for cooperation in designing, planning, and constructing joint facilities.¹²⁵

Indeed, this high-level political agreement intensified CERN staff concerns about Europe’s position as a third, potentially lesser actor. As the seasoned Goldschmidt-Clermont aptly articulated, following the Brezhnev-Nixon agreement, CERN was eager to preserve its relevant role in the expanding East-West collaboration.¹²⁶ In this context, the visionary discussions of a global accelerator project were accompanied by a more pragmatic approach: a new bilateral agreement with the Soviet Union to grant access to the new Intersecting Storage Rings (ISR) and the planned 300 GeV. Diplomatic considerations and CERN’s self-conception as a hub of internationalism regained importance after the decision to locate these accelerators in Geneva. Although this development further distanced leadership from the Serpukhov design, CERN remained committed to maintaining its exchanges, even as genuine scientific interest in conducting research at Soviet facilities declined.¹²⁷

The East-West collaboration held high symbolic value. According to Goldschmidt-Clermont, the diplomatic and institutional aspects of the collaboration were at least as valuable as the scientific returns.¹²⁸ In a 1974 letter to Jentschke, he therefore reported that Soviet teams were eager to expand their formal agreement with CERN, viewing its planned 300 GeV accelerator as an opportunity to remain mutually engaged.¹²⁹ With progress on this new project on European soil, CERN found itself in a markedly stronger negotiating position than it had held five years earlier, when collaboration with the IHEP was initiated. CERN was now better positioned to shape terms, which altered the multipolar exchange system one more time. The Soviet interest in accessing the 300 GeV accelerator transformed this future facility into a potent bargaining chip. This time, CERN’s management requested a financial contribution.¹³⁰ This recalibration brought the CERN–Soviet relationship closer in structure to the US–USSR scientific exchanges, which were explicitly transactional.

The negotiations between Europe and the Soviet Union unfolded against the backdrop of broader geopolitical shifts, most notably the Conference on Security and Cooperation in Europe (CSCE), which was launched in 1973 and culminated

in the Helsinki Summit of 1975.¹³¹ CERN staff closely followed these developments, recognizing the need to align institutional decisions with the diplomatic orientations of CERN member states. In a 1974 internal report, its managers explicitly acknowledged that the outcome of the CSCE would influence the extent to which scientific engagement with the East would be permissible. They delayed decisions on renewing exchange agreements, signaling the extent to which high-energy physics was entangled with geopolitics.¹³² Scientific collaboration was not simply a function of shared research interests, but aligned with foreign policy. Collaborative choices were a barometer of the political climate.

Awaiting the conclusions of the Helsinki Summit, CERN managers prepared the practical aspects of the next collaborative effort, considering it imperative that all details be clearly outlined in a new formal agreement. Indeed, they left no detail to chance, seeking to circumvent the inflexible Soviet bureaucracy.¹³³ Unlike in 1967, when CERN made economic concessions to facilitate collaboration with Serpukhov, now the European organization's leaders were prepared to demand financial contributions. Indicative of this shift, in the May 1974 meeting of the CERN Committee of Council, the Italian delegate D'Andrea stressed the need to share the financial burden, while Jentschke emphasized that Soviet teams should contribute equipment.¹³⁴ The Soviets were receptive. Following a visit to Moscow, CERN's Director of Administration, George Hampton, reported that both Petrosyants and Logunov were willing to continue the collaboration and particularly interested in gaining access to CERN's accelerators, and that "adequate budgets seemed to be available."¹³⁵

Aligned with the diplomatic shifts occurring through the CSCE negotiations, which reshaped relations between Western Europe and the Soviet Union, the physicists' negotiations reached their final stage in 1975. A crucial meeting was held at CERN on July 10, attended by representatives from the Soviet Academy of Sciences and the SCUAE. As Jentschke noted, "co-operation is like vodka. [The taste], once acquired, becomes a habit. There is every reason to continue this habit and extend the collaboration."¹³⁶ The purpose of the meeting was to sign a Protocol to the 1967 Agreement, which focused on granting Soviet access to the 300 GeV accelerator, later inaugurated as the Super Proton Synchrotron (SPS) in 1977 (see figure 3).¹³⁷ This move substantially enhanced CERN's role as a key partner in scientific exchange programs, reflecting its growing significance in the multipolar Cold War world.

Yet multipolarity did not imply equality. The Protocol allowed reciprocal access to European and Soviet facilities. The exchange between CERN and the international facility in Dubna remained governed by an arrangement of letters detailing joint experiments. The scope of exchange with Eastern European countries likewise remained limited. In 1972, exchanges with the East, aside from the Soviet Union, had been encouraged but constrained, with allocations for visitors amounting to a mere 1% of the CERN personal budget.¹³⁸ This policy underscores the enduring international asymmetries built into the framework of



Fig. 3. Bernard Gregory, at the time chairman of the International Committee on Future Accelerators, and Anatoly Logunov, then Vice-president of the Soviet Academy of Science and

scientific collaboration. The vision of a truly global research community was not realized, neither through the creation of a world accelerator nor through bilateral agreements on accelerator access. The agreements forged between 1959 and 1975 revealed persistent imbalances in influence and resources, with the dominant powers—primarily the United States, the Soviet Union, and, increasingly, CERN—exerting disproportionate control over the direction of exchange. Despite these inequities, these agreements marked the beginning of a slow but significant shift, laying the groundwork for a rescaling of the multipolar order. In this emerging phase, scientific exchange would increasingly reflect the agendas of smaller states, reshaping the dynamics of collaboration in ways yet to be fully realized.

Conclusions and Further Considerations

Moving beyond historiographical approaches that emphasize state-to-state diplomacy, our study redirects attention to the activities within and between accelerator laboratories, focusing on how their agreements provided the basis of East-West collaboration. We have highlighted the multilevel nature of these interactions—between scientific communities, institutions, and government representatives—within a multipolar geopolitical framework. Attention to this development has allowed us to move beyond reductive portrayals of scientists as passive instruments of state policy or idealized agents of scientific internationalism. Figures such as the Joliot-Curies, Weisskopf, Logunov, Wilson, and Goldschmidt-Clermont navigated interests between political constraints and scientific aspirations. Moreover, our combined perspective shows that the Cold War was neither a monolithic period nor, at least in high-energy physics, defined solely by competition between the Soviet Union and the United States. The history of high-energy physics was also shaped, to a significant degree, by competition between Americans and Europeans, while much of the rest of the world remained remarkably absent in the primary sources we have studied.

By examining the efforts to establish international exchange between four major accelerator complexes—CERN, JINR, IHEP/Serpukhov, and NAL/Fermilab—we have shown that collaboration often resulted from competition. CERN's creation was far from universally supported. Rather, its early history was shaped by conflicting visions of European integration and national independence. Such tensions also partially explain the creation of the competing JINR in Dubna as a multinational Eastern laboratory, which had a pragmatic collaboration with CERN as one of its founding objectives.

CERN's evolving relationship with Soviet institutions demonstrates how its management and member state representatives handled, at times even subverted, the geopolitical landscape. Towards the end of the 1960s, CERN's growing international standing and exchange with the Soviet Union challenged the United States' monopoly in high-energy physics. In this context, US officers increased their engagement with the Soviet Union, reflecting Washington's effort to reassert scientific leadership. This became particularly visible in initiatives to coordinate the design and planning of next-generation accelerators with Soviet physicists only, aiming to position the US and USSR as co-leaders in scientific advancement, thereby containing European influence. Yet both the bypassing of Europe and the efforts to create a world accelerator failed. Subsequently, international scientific collaboration remained based on bilateral agreements rather than joint efforts, revealing the limits of exchange in high-energy physics when confronted with entrenched national interests.

Although our analysis focuses on exchange agreements during the Cold War, the multipolar dynamics we have traced offers a valuable framework for reflecting on how scientific collaborations are shaped by technical ambition, institutional

strategy, scientific vision, and geopolitical constraint. The viability of exchange programs between accelerator institutions depended not only on scientific merit but also on the balance of the international order that underpins them. Our findings invite considerations on the conditions that make such collaborations possible, the political pressures that sustain or erode them, and the broader stakes when partnerships are forged—or undone.

Viewed historically, the termination of agreements between CERN and Russia, as well as Belarus, in 2022 underscores the fragility and contingency of scientific collaboration, highlighting the extent to which high-energy physics remains deeply dependent on diplomacy (and its limitations). The timing of the termination of exchange is especially significant, as it coincides with CERN's efforts to launch the Future Circular Collider (FCC) designed to reach collision energies of 100 TeV.¹³⁹ This ambitious project, an accelerator unprecedented in scale, requires not only cutting-edge scientific and engineering work but also long-term political alignment and substantial, multinational investment. As the historical precedents illustrate, each new generation of accelerators has reconfigured international exchange. Whether emerging powers are brought into the fold and long-standing partners remain engaged will ultimately shape the future of collaboration on particle accelerators.

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⁷ Prior to the dissolution of the Soviet Union, an agreement was signed to expand collaboration at existing accelerators, complete the LHC design, and construct the Accelerator-Storage Complex (UNK) at Serpukhov. Work on the LHC was incorporated into a Cooperation Agreement that formed the basis for Russian participation, which included the assignment of responsibilities for manufacturing key detectors and the allocation of funds for personnel maintenance: Smirnov, “Russia – CERN Cooperation” (Ref. 4).

⁸ See the introduction of Naomi Oreskes and John Krige, eds. *Science and Technology in the Global Cold War* (Cambridge and London: MIT Press, 2014).

⁹ Daniel J. Kevles, “Big Science and Big Politics in the United States: Reflections on the Death of the SSC and the Life of the Human Genome Project,” *Historical Studies in the Physical and Biological Sciences* **27**, no. 2 (1997), 269–97; Gian Francesco Giudice, “Big Science and the Large Hadron Collider,” *Physics in Perspective* **14**, no. 1 (2012), 95–112.

¹⁰ Grigoris Panoutsopoulos and Theodore Arabatzis, “CERN’s Balancing Act Between Unity and Disunity: The ‘Sister Experiments’ UA1 and UA2 and CERN’s First Nobel Prize,” *Physics in Perspective* **23** (2021), 181–201.

¹¹ For the general argument, see Pierre-Bruno Ruffini, “Collaboration and Competition: The Twofold Logic of Science Diplomacy,” *The Hague Journal of Diplomacy* **15**, no. 3 (2020), 371–82.

¹² Sari Autio-Sarasma and Katalin Miklóssy, “Introduction: The Cold War from a New Perspective,” in *Reassessing Cold War Europe*, ed. Sari Autio-Sarasma and Katalin Miklóssy (New York: Routledge, 2011), 1–15; David Baneke, “The Absence of the East: International Influences on Science Policy in Western Europe during the Cold War,” in *Cold War Science and the Transatlantic Circulation of Knowledge*, ed. Jeroen van Dongen (Leiden, Boston: Brill, 2015), 165–93.

¹³ Autio-Sarasma and Miklóssy, *Reassessing Cold War* (ref. 12), 3.

¹⁴ Sam Robinson, Matthew Adamson, Gordon Barrett, Lif Lund Jacobsen, Simone Turchetti, Aya Homei, et al. “The Globalization of Science Diplomacy in the Early 1970s: A Historical Exploration,” *Science and Public Policy* **50**, no. 4 (2023), 749–58.

¹⁵ Sonja D. Schmid, “Nuclear Colonization?: Soviet Technopolitics in the Second World,” in *Entangled Geographies*, ed. Gabrielle Hecht (Cambridge: MIT Press, 2011), 125–54; Jinyan Liu, Fang Wang, and Alexey Zhemchugov, “Chinese Scientists in Dubna (1956–1965),” *Chinese Annals of History of Science and Technology* **5**, no. 2 (2021), 31–88.

¹⁶ There is an abundance of documents generated in these bureaucratized East-West exchange programs. However, access restrictions that are aggravated by the current Russian-Ukrainian war led to an undeniable asymmetry in the volume of sources we were able to study. The article draws on documents from: CERN Archives, Geneva, Switzerland, Files Director-Generals [hereafter DG-FILES], Yves Goldschmidt-Clermont Papers [hereafter YGC]; Mervyn Hine Papers [hereafter MGHN] and William Owen Lock Papers [hereafter WOL]; Swiss Federal Archives, Bern, Switzerland, File Überwachungsdienste: CERN und andere [hereafter BAR E7120-02#1998/405#164*]; German Federal Archives, Koblenz, Germany, Files Bundesministerium für Bildung und Wissenschaft [hereafter B 138/4657]; National Archives and Records Administration at San Francisco, United States, RG 326, Laboratory and Scientific Conference Papers of Edwin McMillan, 1948-1974 [hereafter McMillan NASF]; National Archives and Records Administration, College Park, United States, RG 326, Correspondence Relating to High Energy Physics, 1957-1964, RG 326 [hereafter HEP NACP]; Russian State Archive of Contemporary History (Rossiyskii Gosudarstvennyi Arkhiv Noveishei Istorii) [hereafter RGANI]; Russian State Archive of Socio-Political History (Rossiyskii gosudarstvennyi arkhiv sotsial'no-politicheskoy istorii) [hereafter RGASPI]. We have also used digitized materials from the following collections on the CERN Document Server (<https://cds.cern.ch>), [hereafter CDS]: Council and Committee of Council; Scientific Policy Committee, accessible at <https://cds.cern.ch/collection/Council-related%20Committees?ln=en>. All translations from Russian, German and French to English are by the authors.

¹⁷ Simone Turchetti, “Contesting American Hegemony: Attacks to US Scientific Initiatives in Cold War Europe (and Means to Secretly Defy These Challenges),” *History and Technology* **40**, no. 1–2 (2024), 109–28.

¹⁸ Tina Crossfield, “Irène Joliot-Curie: Following in her Mother’s Footsteps,” in *Devotion to Their Science*, ed. Marelene F. Rayner-Canham and Geoffrey W. Rayner-Canham (McGill-Queen’s University Press 1997), 97–123, 115. Three years his senior, Irène supervised Frédéric at the Radium Institute and was considered the better scientist in the couple.

¹⁹ See Susan McCall Perlman, “US Intelligence and Communist Plots in Postwar France,” *Intelligence and National Security* **33**, no. 3 (2018), 376–90; Susan McCall Perlman, “Contesting France: French Informants and American Intelligence in the Dawning Cold War,” *Cold War History* **17**, no. 1 (2017), 81–98.

²⁰ Barton J. Bernstein, “The Quest for Security: American Foreign Policy and International Control of Atomic Energy, 1942-1946,” *The Journal of American History* **60**, no. 4 (1974), 1003.

²¹ L.P. Beria to I. V. Stalin, “On Joliot-Curie’s suggestion of cooperation in the Field of Uses of Atomic Energy,” not earlier than September 12, 1945, AP RF. F. 93, D. 145/46, L. 13-14.

²² Alan Kirk to Dean Acheson, January 10, 1947, <https://history.state.gov/historicaldocuments/frus1947v01/d397>.

²³ Kirk to Acheson (ref. 22).

²⁴ Translation of a memorandum presented to Kirk by Paul Spaak on the evening of February 4, reproduced verbatim in a telegram from Kirk to Acheson, January 5, 1947. <https://history.state.gov/historicaldocuments/frus1947v01/d401>.

²⁵ The plea is first presented in Kirk to Acheson, January 5, 1947 (ref. 24), and reiterated in the subsequent memorandum, in which Kirk pressed Acheson: “I believe it really urgent that this question be examined and settled,” Kirk to Acheson, January 10, 1947 (ref. 22).

²⁶ George Marshall to Kirk, February 10, 1947. <https://history.state.gov/historicaldocuments/frus1947v01/d402>.

²⁷ Kirk to Marshall, April 15, 1947, <https://history.state.gov/historicaldocuments/frus1947v01/d414#fn:1.7.4.44.48.42.2>.

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²⁸ Kirk to Marshall, April 15, 1947, (ref. 27).

²⁹ Perlman, "Contesting France" (ref. 19); Geoffrey Roberts, "Science, Peace and Internationalism: Frédéric Joliot-Curie, the World Federation of Scientific Workers and the Origins of the Pugwash Movement," in *Science, (Anti-)Communism and Diplomacy: The Pugwash Conferences on Science and World Affairs in the Early Cold War*, ed. Alison Kraft and Carola Sachse (Leiden: Brill, 2020), 43–77; Emmanuel Godin and Martin Evans, *France since 1815: Modern History for Modern Languages*, (New York, NY: Routledge, 2014), 135.

³⁰ Marshall to Kirk, May 14, 1947, <https://history.state.gov/historicaldocuments/frus1947v01/d414>.

³¹ Marshall to Kirk, May 14, 1947, (ref. 30). For Marshall, these activities were linked to the ongoing disputes between the Soviet Union and the United States at the UNAEC related to international control of atomic energy. The Belgian public should be made aware of the obstructionist role of the Soviet Union. For the Soviet opposition to the Baruch Plan, see David Holloway, "The Soviet Union and the Creation of the International Atomic Energy Agency," *Cold War History* **16**, no. 2 (2016), 3–6.

³² Marshall to Kirk, May 14, 1947, (ref. 30).

³³ Roberts, "Science, Peace" (ref. 29).

³⁴ Alan Kirk to Dean Acheson, May 5, 1950, in *Foreign Relations of the United States, 1950, National Security Affairs; Foreign Economic Policy*, ed. Neal H. Petersen, John P. Glennon, David W. Mabon, Ralph R. Goodwin, and William Z. Slany (Washington D.C.: United States Government Printing Office, 1977), 1: 698.

³⁵ Soviet scientists' appeal "In defence of Joliot-Curie," approved by the CC CPSU on May 12, 1950, RGASPI. F. 17. Op. 3. D. 1081. L. 34

³⁶ John Krige, "Felix Bloch and the Creation of a 'Scientific Spirit' at CERN," *Historical Studies in the Physical and Biological Sciences* **32**, no. 1 (2001), 57–69, 63.

³⁷ Lew Kowarski, *An Account of the Origins and Beginnings of CERN*, Annex I and II (Geneva: CERN, 1961); John Krige, "Isidor I. Rabi and CERN," *Physics in Perspective* **7**, no. 2 (2005), 150–64, 159.

³⁸ Historians have shown that the latter vision was supported by the United States across economic, scientific, and intelligence domains. Allan A. Needell, *Science, Cold War and the American State: Lloyd V. Berkner and the Balance of Professional Ideals* (New York, Abington: Routledge, 2020), 141–49; Ronald E. Doel, "Scientists, Secrecy, and Scientific Intelligence: The Challenges of International Science in Cold War America," in *Cold War Science and the Transatlantic Circulation of Knowledge*, ed. Jeroen van Dongen, Friso Hoeneveld, and Abel Streefland (Leiden, Boston: Brill, 2015), 11–35; Wolfe, *Freedom's Laboratory* (ref. 5).

³⁹ Dominique Pestre, "French Attitudes to the European Laboratory, 1949-1954," in *History of CERN, Vol I: Launching the European Organization for Nuclear Research*, eds. Armin Hermann, John Krige, Ulrike Mersits, and Dominique Pestre (Amsterdam, Oxford, New York, Tokyo: North-Holland, 1987), 303–51.

⁴⁰ Turchetti, "Contesting" 114 (ref. 17).

⁴¹ "European Physics Laboratory," *Physics Today* **6**, no. 8 (1953), 20–22.

⁴² John Krige, "Case Studies of Some Important Decisions," in *History of CERN, Vol. I: Launching the European Organization for Nuclear Research*, ed. Armin Hermann, John Krige, Ulrike Mersits, and Dominique Pestre (Amsterdam, Oxford, New York, Tokyo: North-Holland, 1987), 237–92, 250–52.

⁴³ Hiroshi Ichikawa, "Obninsk, 1955: The World's First Nuclear Power Plant and 'the Atomic Diplomacy' by Soviet Scientists," *Historia Scientiarum* **26**, no. 1 (2016), 25–41; Holloway, "The Soviet Union" (ref. 31); V. Malyshev, B. Vannikov, and I. Kurchatov to the Central Committee of

the CPSU, “Ob ispol’zovanii atomnoy energii v stranakh narodnoy demokrati i kitayskoy narodnoy respublike,” December 28, 1954, in I.V. Kurchatov, *Sobranie nauchnykh trudov* (Moscow: Nauka, 2013), 6:134–36.

⁴⁴ W.O. Lock, “Collaboration CERN-JINR (Dubna) and CERN-USSR 1955–1975,” *Europhysics News* **6**, no. 7 (1975), 1–4.

⁴⁵ Referred to as the “Lacy-Zarubin agreement,” this was initially signed in 1958 and renegotiated through the final years of the USSR, see Yale Richmond, *Cultural Exchange and the Cold War: Raising the Iron Curtain* (University Park: Pennsylvania State University Press, 2003); Shields, “Mathematics, Peace, and the Cold War” (ref. 5); Tatarchenko and Phillips, “Mathematical Superpowers” (ref. 5).

⁴⁶ Note from the First Deputy Minister of Medium Machine Building of the USSR, B.L. Vannikov, “On establishing the Eastern Laboratory of Nuclear Research,” November 4, 1955 (top secret), RGANI F. 3. Op. 8. D. 329. L. 54–56. According to the memoir of the Chairman of the Chief Administration for the Use of Atomic Energy, during the 1955 Geneva Conference, CERN scientists rejected the Soviet delegation’s informal proposal to join CERN, see Roman Khandozhko, “Quantum Tunneling through the Iron Curtain: the Soviet Nuclear City of Dubna as a Cold War Crossing Point,” *Cahiers Du Monde Russe* **60**, no. 2/3 (2019), 369–96, 375. The official argument against inviting new members was that the organisation’s establishment should be prioritized, see 2nd Session of the Council, February 24, 1955, 22, CDS.

⁴⁷ Vannikov, “On establishing the Eastern Laboratory” (ref. 46).

⁴⁸ Vannikov, “On establishing the Eastern Laboratory” (ref. 46); and “Draft of the letter addressed to the leadership of the Communist Parties of Poland, Czechoslovakia, GDR, Hungary, Bulgaria, Romania, regarding the establishment of the Eastern Laboratory for Nuclear Research,” RGANI F. 3. Op. 8. D. 329. L. 57–58; and “Resolution of the Presidium of the Central Committee of the CPSU ‘On the Organization by Countries of People’s Democracy of the Eastern Laboratory of Nuclear Research’,” November 16, 1955, RGANI F. 3. Op. 10. D. 197. L. 13.

⁴⁹ Operational in 1957, that accelerator gave the East an edge in high-energy physics, see Resolution of the CPSU Central Committee “On the organization of the Eastern Institute for Nuclear Research,” January 14, 1956, RGANI F. 3. Op. 10. D. 215. L. 32–33. The CIA reported that “the USSR will soon be in a pre-eminent position [in high-energy nuclear physics]. Soviets will thus be enabled to perform experiments in [this field] which cannot be performed in the West,” see CIA, Current Intelligence Bulletin, August 23, 1955, <https://www.cia.gov/readingroom/docs/CIA-RDP79T00975A002100530001-8.pdf>.

⁵⁰ CC CPSU, Memorandum on the Establishment of the Eastern Institute for Nuclear Research, January 14, 1956, RGANI F. 3. Op. 10. D. 215. L. 34–36.

⁵¹ CC CPSU, Memorandum, (ref. 50).

⁵² The founding countries were the USSR, China, Albania, Bulgaria, Hungary, the German Democratic Republic, North Korea, Mongolia, Poland, Romania, and Czechoslovakia. Vietnam joined in September 1956, see <https://www.jinr.ru/history-en/>.

⁵³ Topchiev and Tsarapkin to Molotov, March 24, 1956, RGANI F. 5. Op. 12. D. 22. L. 40.

⁵⁴ “Draft Resolution of the Central Committee of the Communist Party of the Soviet Union,” March 26, 1956, RGANI F. 3. Op. 12. D. 22. L. 39.

⁵⁵ Avraami Zavenyagin and Andrei Gromyko to the Central Committee of the Communist Party of the Soviet Union, June 28, 1956, RGANI F. 3. Op. 12. D. 75. L. 65; and Resolution of the Presidium of the Central Committee of the Communist Party of the Soviet Union, July 6, 1956, RGANI F. 3. Op. 14. D. 39. L. 5.

⁵⁶ Khandozhko, “Quantum Tunneling” (ref. 46), 380.

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⁵⁷ Note by the Head of the Department of Science and Culture of the Central Committee of the Communist Party of the Soviet Union, Vladimir Kirillin, on the invitation of one of the employees of the Curie Laboratory to work at the Institute of Nuclear Problems of the USSR Academy of Sciences on February 26, 1956, RGANI. F. 4. Op. 10. 16. D. 8. L.27.

⁵⁸ Resolution of the Secretariat of the Central Committee of the Communist Party of the Soviet Union "On Inviting an Employee of the Curie Laboratory to the USSR," March 5, 1956, RGANI. F. 4. Op. 10. 16. D. 8. L.27; and RGANI. F. 4. Op. 15. D. 2. L. 5. Before being submitted to the CC CPSU, this plan was approved by the Director of the Institute of Nuclear Problems, the Ministry of Medium Machine Building, and the Department of Science and Culture of the CC CPSU.

⁵⁹ In 1958, the Soviets approached Frédéric Joliot-Curie regarding a potential collaboration on fusion science: Gromyko Vinogradov, draft written by July 28, 1958 and discussed by the CC CPSU on August 15, 1958. RGANI. F. 3. Op. 12. D. 416. L. 138. Further details, see Hof and Silva Neto (ref. 2).

⁶⁰ W.O. Lock, *A History of the Collaboration between the European Organization for Nuclear Research (CERN) and the Joint Institute for Nuclear Research (JINR) and with Soviet Research Institutes in the USSR 1955-1970* (Geneva: CERN, 1975), 4.

⁶¹ J.B. Adams to Blokhintsev, June 14, 1960, DG-FILES-186.

⁶² "CERN-DUBNA Exchange," *CERN Courier* **1**, no. 12 (1960), 2; H. Coblans, "The European Organization for Nuclear Research (CERN) and International Scientific Collaboration," *Scientific World* **5**, no. 1 (1961), 7.

⁶³ S.A.ff Dakin to all scientific staff (Grade 9 and above), CERN fellows and research associate, August 8, 1961, MGNH-012; S.A.ff Dakin to D.I. Blokhintsev, December 21, 1961, DG-FILES-186; Management Committee, December 15, 1961, DG-FILES-469.

⁶⁴ Summary discussion E. Fenyés, B.P. Gregory, W.O. Lock, L. van Hove on January 28, 1966, DG-FILES-194; "Six months at Dubna," *CERN Courier* **2**, no.10 (1962), 8-9.

⁶⁵ Summary of discussion between N.N. Bogolov and B.P. Gregory on October 19, 1966, DG-FILES-194.

⁶⁶ We could not access archival sources on the history of Serpukhov, but did make use of the following website: http://exwww.ihep.su/ihep/hist/ihep_hist.htm.

⁶⁷ Committee of Council, 111th meeting, Draft minutes, November 7, 1974, 9, CDS.

⁶⁸ "CERN as an Institute for International Cooperation?" *Bulletin of the Atomic Scientists* **16**, no. 2 (1960), 54–7. For Switzerland's role, see Bruno Strasser, "The Coproduction of Neutral Science and Neutral State in Cold War Europe: Switzerland and International Scientific Cooperation, 1951–69," *Osiris* **24**, no. 1 (2009), 165–87.

⁶⁹ De Gaulle's revisionist concept of détente challenged the division of Europe, see Frédéric Gloriant, "To Adapt to the Cold War Bipolar Order? Or to Challenge It? Macmillan and de Gaulle's Rift in the Face of the Second Berlin Crisis," *Cold War History* **18**, no. 4 (2018), 465–83. See also: Garret J. Martin, *General de Gaulle's Cold War Challenging American Hegemony, 1963–1968* (New York and Oxford: Berghahn, 2013).

⁷⁰ Victor Weisskopf to Donald P. Hornig, May 31, 1965, DG-FILES-575. At the beginning of the 1950s, up to 80% of visa requests from France were delayed or refused, see Jessica Wang, *American Science in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (Chapel Hill: University of North Carolina Press, 1999), 278.

⁷¹ Convention, texte joint à la lettre du 15 Août, traduit le 29/8/66, DG-FILES-189.

⁷² Victor McElheny, "Franco-Russian Collaboration in Science: De Gaulle's Visit," *Science* **153**, no. 3731 (1966), 43.

⁷³ “Franco-Soviet Projects,” *The Washington Post*, November 11, 1966, E 11.

⁷⁴ Lock, *A History of the Collaboration* (ref. 60), 12.

⁷⁵ Victor Weisskopf to A.M. Petrosyants, June 22, 1965, DG-FILES-194.

⁷⁶ Victor Weisskopf to F. Perrin, February 1, 1965, DG-FILES-194. Details in Lock, *A History of the Collaboration* (ref. 60), 2. Connected to the bubble chamber, the SF-separator ejects and sorts beams.

⁷⁷ Victor Weisskopf to A.A. Logunov, August 17, 1965, and A. Rousset to B. Gregory, November 25, 1965, and Victor Weisskopf to A.M. Petrosyants, December 9, 1965, all in DG-FILES-194.

⁷⁸ Scientific Policy Committee, 41st meeting, November 29, 1967, DG-FILES-194.

⁷⁹ Bertrand Goldschmidt to Bernard P. Gregory, August 31, 1966, and Gregory to G.H. Hampton, L. van Hove, P. Germain, Ch. Peyrou, P. Paul, M.G.N. Hine, K. Johnson, undated, all in DG-FILES-189; B.P. Gregory to B. Goldschmidt, April 18, 1967, DG-FILES-194. See also: Protocol annex to agreement signed at Moscow on July 4, 1967, YGC-038.

⁸⁰ Gregory to Logunov, “Draft Memorandum,” July 4, 1967, DG-FILES-194; Jentschke to Logunov, Draft June 3, 1971, YGC-025; Robert D. Sard to Bernard Gregory, December 31, 1969, DG-FILES-189.

⁸¹ Bernard Gregory to A.A. Logunov, January 5, 1970, DG-FILES-189. Before shipment, all equipment had to be completely assembled and tested, see G. Verkerker, “Status of CERN-IHEP Collaboration on Data-Handling Problems,” June 2, 1971, YGC-025. In 1970, the design of the major parts of the final equipment was complete, B. Kuiper, “Contribution to Annual Report, Fast Ejection Group, PS Department,” January 19, 1971, YGC-038.

⁸² Mario Daniels and John Krige, *Knowledge Regulation and National Security in Postwar America* (Chicago: University of Chicago Press, 2022); Frank Cain, *Economic Statecraft during the Cold War: European responses to the US trade Embargo* (London and New York: Routledge, 2007), 123; The export and re-export mechanism in Switzerland was specified in the Holtz-Lindner Agreement signed in 1951 as part of the larger CoCom.

⁸³ Notiz betr. Exportlizenzen USA im Zusammenhang mit den amerikanischen Marshall-Plan-Lieferungen (Wiederausfuhr aus der Schweiz), gez. Warthmüller, February 2, 1948, BAR E7120-02#1998/405#164*.

⁸⁴ M. Bruner (Verein Schweizerischer Maschinen-Industrieller) to CERN, October 14, 1970, BAR E7120-02#1998/405#164*.

⁸⁵ At least for the Federal Republic of Germany and France, archival documents do not give evidence of any resistance to the shipping plans. There were three categories: Swiss-made, produced at CERN, and foreign origin. For the latter, the origin countries had to provide re-export licenses, while for the other categories, Switzerland alone was responsible, see Telegramm des Bundesministeriums für wissenschaftliche Forschung Bonn an CERN, June 10, 1968, Ministère des affaires étrangères à CERN June 7, 1968, BAR E7120-02#1998/405#164*; Eidgenössisches Politisches Departement an den Verein Schweizerischer Maschinen-Industrieller, an die Handelsabteilung des Eidgenössischen Volkswirtschaftsdepartements, un Sektion für Ein- und Ausfuhr, May 24, 1968, BAR E7120-02#1998/405#164*.

⁸⁶ C. Inderbitzin (Verein Schweizerischer Maschinen-Industrieller) an Handelsabteilung des Eidgenössischen Volkswirtschaftsdepartementes, June 14, 1968, BAR E7120-02#1998/405#164*.

⁸⁷ List of equipment for CERN-Serpukhov collaboration, April 25, 1969, B 138/4657.

⁸⁸ Fernschreiben verschlüsselt aus Paris (Diplo) an BMWI, May 5, 1969, B 138/4657; P. Germain to C. Zelle (BMwF), April 25, 1969; Schnellbrief C. Zelle (BMwF) an Loebecke (Bundesministerium für Wirtschaft), May 20, 1969, and C. Zelle an Loebecke, May 22, 1969, B 138/4657.

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⁸⁹ Donatsch (services des importations et exportations) à CERN, October 27, 1967, BAR E7120-02#1998/405#164*. After much paperwork, they decided that the IHEP would provide all equipment for the second part of the experiment: W.O. Lock to Director General CERN, May 13, 1968, DG-FILES-189.

⁹⁰ Lock, *A History of the Collaboration* (ref. 60), 21. Further details in Grigoris Panoutsopoulos, "Investigating CERN's Science Diplomacy in the Midst of the Cold War: The Case of the CERN-Serpukhov Collaboration," in *The Missing Interaction: Science and Diplomacy in the Early Cold War*, ed. Maria Rentetzi (Brepols, forthcoming).

⁹¹ Confidential report by D. Ph, June 28, 1971, and "Status Report prepared for Prof. W. Jentschke's trip," June 4, 1971, and "Summary of the joint scientific committee CERN-IHEP," July 6–9, 1971, YGC-025. Jentschke led the so-called Laboratory I while his co-director John B. Adams led Laboratory II at CERN. The two units were later reunited.

⁹² Under Secretary's Office, December 15, 1950 [DocID:34315722], Folder Yves Goldschmidt-Clermont, Box 8, Entry A13008-A, RG 59, NACP [NW#57570].

⁹³ 48th Session of the Council, June 15 and 16, 1972, 9, CDS.

⁹⁴ Preliminary draft DG's speech for the Serpukhov Inauguration Ceremony, May 17, 1972, DG-FILES-193. Jentschke's claim is not entirely accurate, as our discussion in the section "Opposing the American Monopoly" makes clear.

⁹⁵ Meeting with Petrosyants, short summary by Goldschmidt-Clermont, June 9, 1972, YGC-038.

⁹⁶ "U.S. and U.S.S.R. exchange visits of nuclear scientists to begin on May 12, note for immediate release by USAEC," San Francisco Operations Office, May 11, 1960, McMillan NASF, Box 11, Folder Visitors USSR 1960; "US-USSR Exchange Program," *Physics Today* **13**, no. 1 (1960), 84.

⁹⁷ Vitaly S. Pronskikh, "E-36: The First Proto-Megascience Experiment at NAL" *Physics in Perspective* **18**, no. 4 (2016), 357–78.

⁹⁸ George Kolstad to Paul W. McDaniel, November 6, 1962, in Folder Accelerators - General (1959-1963), Box 1, Entry A139, HEP NACP.

⁹⁹ For the US influence on Europe, see John Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe* (Cambridge, London: MIT Press, 2006).

¹⁰⁰ B. W. Montague to Victor Weisskopf, November 10, 1965, DG-FILES-194.

¹⁰¹ B.P. Gregory to W.K.H. Panofsky, April 18, 1967, DG-FILES-194. By this time, leading US accelerator facilities were located at Brookhaven, Berkeley, and the SLAC.

¹⁰² W.K.H. Panofsky to B.P. Gregory, April 24, 1967, DG-FILES-194.

¹⁰³ Acting Assistant Director for High Energy Physics to W. McDaniel and William A. Wallenmeyer, August 24, 1964, folder 1964 international conference on HEP at Dubna, box 2, HEP NACP.

¹⁰⁴ Luke C.L. Yuan to Anatoli Logunov, August 4, 1966, DG-FILES-192.

¹⁰⁵ Arne Lundby to Bernard Gregory, March 22, 1966, DG-FILES-177. For the history of Fermilab, see Lillian Hoddeson, Adrienne W. Kolb, and Catherine Westfall, *Fermilab: Physics, the Frontier, and Megascience* (Chicago: University of Chicago Press, 2008).

¹⁰⁶ Chairman to Petrosyants, April 10, DG-FILES-177. While the letterhead shows no year, it becomes clear from the content.

¹⁰⁷ Paul W. McDaniel to Edwin McMillan, November 20, 1967, Folder USSR-USA Visitor exchange, Box 11, McMillan NASF.

¹⁰⁸ Maurice Goldhaber to A.A. Logunov, May 3, 1968, Folder USSR-USA Visitor exchange, Box 11, McMillan NASF.

- ¹⁰⁹ Léon van Hove to Robert L. Walker, April 16, 1969, DGR-LVH-189.
- ¹¹⁰ Reference paper for Serpukhov negotiations, W.K.H. Panofsky, February 27, 1969, DG-FILES-192.
- ¹¹¹ Gloria B. Lubkin, "US-Soviet Collaboration to Measure Pion Charge Radius," *Physics Today*, **23**, no. 9 (1970), 18–19.
- ¹¹² "USA-USSR Protocol," *CERN Courier* **12** no. 10 (1970), 393.
- ¹¹³ The Soviet Union supplied a gas jet hydrogen target, a system of local and remote control of the target, the set of semi-conducting detectors and the data acquisition electronics, see Annex 1 (December 7, 1971) to the Protocol on carrying out of joint projects in the field of high energy physics at the accelerators of the National Laboratory (Batavia), USA, and the Institute for High Energy Physics (Serpukhov), USSR, between USAEC and State Committee, November 30, 1970, DG-FILES-192.
- ¹¹⁴ Academician Keldysh to President Handler, Translation, January 8, 1971, DG-FILES-192.
- ¹¹⁵ Weisskopf to Seaborg, July 15, 1971, DG-FILES-192.
- ¹¹⁶ Keldysh to President Handler, Translation, June 9, 1971, DG-FILES-192.
- ¹¹⁷ "First Pulses at 200 GeV," *CERN Courier* **12**, no. 4 (1972), 121.
- ¹¹⁸ Goldschmidt-Clermont, "Spare parts for Serpukhov," February 17, 1971, YGC-025.
- ¹¹⁹ C. J. Zilverschoon, "Impressions and Conclusions from visit to USA" undated, DG-FILES-339.
- ¹²⁰ Adrienne Kolb and Lillian Hoddeson, "The Mirage of the 'World Accelerator for World Peace' and the Origins of the SSC, 1953–1983," *Historical Studies in the Physical and Biological Sciences* **24**, no. 1 (1993), 101–24.
- ¹²¹ Robert R. Wilson to Jentschke, February 1974, YGC-040.
- ¹²² Weisskopf to Handler, September 23, 1971, DG-FILES-192.
- ¹²³ Scientific Policy Committee, 69th meeting, June 13, 1972, CERN/SPC/328/Draft, 7–8, CDS.
- ¹²⁴ Goldschmidt-Clermont, "Briefing for the Committee of Council," April 15, 1975, CERN-ARCH-YGC-038.
- ¹²⁵ Soviet-American Agreements, June 1973. *Current History* **65**, no. 386 (1973), 173–75.
- ¹²⁶ Y. Goldschmidt-Clermont to W. Jentschke, May 13, 1974, YGC-038.
- ¹²⁷ Goldschmidt-Clermont, "Scientific Collaboration with the USSR," August 15, 1973, YGC-040, 4.
- ¹²⁸ He saw the exchange with the East more in terms of a political desire, whereas such a decision would hardly be necessary with the United States, where CERN had "many informal and formal contacts, arising from a long tradition," see Goldschmidt-Clermont, "Scientific Collaboration with the USSR," September 30, 1973, YGC-038, 1.
- ¹²⁹ Goldschmidt-Clermont to Jentschke (ref. 126).
- ¹³⁰ "Summary of the Discussions in Closed Session," Committee of Council, 100th meeting, May 18, 1972, 2–3; Scientific Policy Committee, 69th meeting, CERN/SPC/328/Draft, June 13, 1972; Committee of Council, 101st meeting, CERN/CC/1071/Draft, June 15, 1972: all in CDS.
- ¹³¹ Susan Colbourn, "The Final Act: The Helsinki Accords and the Transformation of the Cold War," *Political Science Quarterly* **134**, no. 4 (2019), 753–54.
- ¹³² Committee of Council, 108th meeting, May 16, 1974, 6–8, CDS.
- ¹³³ "Letter to Drell: Notes on the CERN-USSR collaboration," undated, YGC-040, 2.
- ¹³⁴ Committee of Council, 108th meeting, (ref. 132), 5–7.

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¹³⁵ Committee of Council, 111th meeting, Draft Minutes CERN/CC/1156, November 7, 1974, 9, CDS.

¹³⁶ Willibald Jentschke, Signature CERN-URSS, July 10, 1975, CERN-AUDIO-1975-010, 5:50-5:57 min, <https://cds.cern.ch/record/923627?ln=en>.

¹³⁷ 55th Session of the Council, “Collaboration CERN and Scientific Institutes in the USSR, Draft Protocol,” June 25 and 26, 1975, 3, CDS. In December 1975, the Italian experimental physicist Giuseppe Fidecaro assumed responsibility for the exchange program, succeeding Goldschmidt-Clermont, see Jentschke to Yves Goldschmidt-Clermont, November 28, 1975, YGC-043; Goldschmidt-Clermont to W. Jentschke, September 17, 1975, and Fidecaro to Jentschke, November 26, 1975, DG-FILES-195.

¹³⁸ Committee of Council, 100th meeting, May 18, 1972, 3, CDS; Scientific Policy Committee, “Draft minutes of the closed session,” 68th meeting, May 16, 1972, CDS.

¹³⁹ CERN, “Future Circular Collider,” 2025, <https://home.cern/science/accelerators/future-circular-collider>.

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