

Search for η' mesic nuclei in GSI/FAIR

K. Itahashi¹, Y. Ayyad², J. Benlliure³, K.-T. Brinkmann⁴, S. Friedrich⁴, H. Fujioka⁵,
H. Geissel^{4,6}, J. Gellanki⁷, C. Guo⁸, E. Gutz⁴, E. Haettner⁶, M. N. Harakeh⁷,
R. S. Hayano⁹, Y. Higashi¹⁰, S. Hirenzaki¹⁰, C. Hornung⁴, Y. Igarashi¹¹, N. Ikeno¹²,
M. Iwasaki¹, D. Jido¹³, N. Kalantar-Nayestanaki⁷, R. Kanungo¹⁴, R. Knoebel^{4,6}, N. Kurz⁶,
V. Metag⁴, I. Mukha⁶, T. Nagae⁵, H. Nagahiro¹⁰, M. Nanova⁴, T. Nishi¹, H. J. Ong²,
S. Pietri⁶, A. Prochazka⁶, C. Rappold⁶, M. P. Reiter⁶, J. L. Rodríguez-Sánchez³,
C. Scheidenberger^{4,6}, H. Simon⁶, B. Sitar¹⁵, P. Strmen¹⁵, B. Sun⁸, K. Suzuki¹⁶, I. Szarka¹⁵,
M. Takechi¹⁷, Y. K. Tanaka⁹, I. Tanihata^{2,8}, S. Terashima⁸, Y. N. Watanabe⁹, H. Weick⁶,
E. Widmann¹⁶, J. S. Winfield⁶, X. Xu⁶, H. Yamakami⁵, J. Zhao⁸.

¹*Nishina Center for Accelerator-Based Science, RIKEN, Wako, 351-0198 Saitama, Japan,*

²*RCNP, Osaka University, 10-1 Mihogaoka, Ibaraki, 567-0047 Osaka, Japan,*

³*Universidad de Santiago de Compostela, 15782 Santiago de Compostela, Spain,*

⁴*Universität Giessen, Heinrich-Buff-Ring 16, 35392 Giessen, Germany,*

⁵*Kyoto University, Kitashirakawa-Oiwakecho, Sakyo-ku, 606-8502 Kyoto, Japan,*

⁶*GSI Helmholtzzentrum für Schwerionenforschung GmbH, 64291 Darmstadt, Germany,*

⁷*KVI-CART, University of Groningen, Zernikelaan 25, 9747 AA Groningen, the Netherlands,*

⁸*Beihang University, Xueyuan Road 37, Haidian District, 100191 Beijing, China,*

⁹*The University of Tokyo, 7-3-1 Hongo, Bunkyo, 113-0033 Tokyo, Japan,*

¹⁰*Nara Women's University, Kita-Uoya Nishi-Machi, 630-8506 Nara, Japan,*

¹¹*KEK, 1-1 Oho, Tsukuba, 305-0801 Ibaraki, Japan,*

¹²*Tottori University, 4-101 Koyamacho-minami, 680-8551 Tottori, Japan,*

¹³*Tokyo Metropolitan University, 1-1 Minami-Osawa, Hachioji, 192-0397 Tokyo, Japan,*

¹⁴*Saint Mary's University, 923 Robie Street, Halifax, Nova Scotia B3H 3C3, Canada,*

¹⁵*Comenius University Bratislava, Mlynská dolina, 842 48 Bratislava, Slovakia,*

¹⁶*Stefan-Meyer-Institut für subatomare Physik, Boltzmannsgasse 3, 1090 Vienna, Austria,*

¹⁷*Niigata University, 8050 Ikarashi 2-no-cho, Nishi-ku, 950-2181 Niigata, Japan.*

η -PRiME/SuperFRS Collaboration

E-mail: itahashi@riken.jp

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Origin of an exceptionally large mass of an η' meson has been attracting many theoretical and experimental studies. A large mass reduction was predicted for η' mesons accommodated in a nuclear medium, which leads to possible existence of η' -mesic nuclei, η' mesons bound to nuclei. We conducted a direct experimental search for the η' -mesic nuclei in GSI by measuring excitation spectra of ^{11}C nuclei near the η' emission threshold. The present status of the experimental data analysis and future perspectives are discussed.

KEYWORDS: η' -mesic nuclei, $U_A(1)$ anomaly, Chiral symmetry

1. Introduction

The masses of low-lying pseudo-scalar mesons distribute in a wide range from 140 to 960 MeV/ c^2 , which demonstrates the complex and interesting features of their origin in relation to the non-trivial structure of the vacuum [1]. An overall explanation of the origin will certainly lead to an