TN-62-61
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CAVITY DIMENSIONS FOR CONSTANT GRADIENT ACCELERATOR SECTIONS

$\tau = 0.40$, $2\pi/3$ - Mode

R.B. Neal showed in TN-62-51 that except for the reduction in beam energy, the general statement can be made that the use of a low value of the attenuation parameter τ results in improvement of all of the factors measuring the performance of the accelerator. Following the publication of TN-62-51* it was decided that cavity dimensions should be determined for constant gradient sections with a value of $\tau = 0.40$, for both disk thicknesses of $t = 0.230$ in and $t = 0.120$ in. The purpose of this note is to consolidate the results for these two designs.

The data for $\tau = 0.40$ are presented in exactly the same form and for the same conventions as those for $\tau = 0.57$ given in TN-62-46. In the meantime, the $\tau = 0.57$, $t = 0.230$ in. design has been adopted for the two-mile accelerator and the $\tau = 0.40$ designs are only of academic interest.

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* The reduction in shunt impedance incurred in choosing the $\tau = 0.40$ design rather than the $\tau = 0.57$ would be approximately 7%.

DIMENSIONS OF CONSTANT GRADIENT ACCELERATOR SECTION

(t = 0.120")

2π/3 Mode; 86 Cavities, τ = 0.40

CAVITY	2A	2B	H	GROUP VEL. v_g/c	CAVITY	2A	2B	H	GROUP VEL. v_g/c
0	1.0006	3.2645	.87306	.0250383	43	.89981	3.2399	.67530	.0180883
1	.99878	3.2640	.87463	.0248767	44	.89729	3.2394	.67799	.0179267
2	.99682	3.2635	.87622	.0247151	45	.89476	3.2388	.68064	.0177651
3	.99482	3.2630	.87783	.0245534	46	.89222	3.2383	.68327	.0176034
4	.99279	3.2625	.87945	.0243918	47	.88969	3.2377	.68586	.0174418
5	.99073	3.2620	.88110	.0242302	48	.88714	3.2371	.68843	.0172802
6	.98863	3.2614	.88275	.0240686	49	.88459	3.2366	.69097	.0171186
7	.98651	3.2609	.88442	.0239069	50	.88204	3.2360	.69349	.0169569
8	.98435	3.2603	.88611	.0237453	51	.87947	3.2354	.69598	.0167953
9	.98217	3.2598	.88780	.0235837	52	.87690	3.2349	.69845	.0166337
10	.97996	3.2592	.88950	.0234220	53	.87432	3.2343	.70090	.0164720
11	.97773	3.2587	.89121	.0232604	54	.87173	3.2337	.70333	.0163104
12	.97547	3.2581	.89292	.0230988	55	.86913	3.2332	.70574	.0161488
13	.97319	3.2575	.89464	.0229372	56	.86651	3.2326	.70814	.0159872
14	.97089	3.2570	.89636	.0227755	57	.86389	3.2321	.71052	.0158255
15	.96858	3.2564	.89809	.0226139	58	.86125	3.2315	.71288	.0156639
16	.96624	3.2558	.89981	.0224523	59	.85860	3.2310	.71522	.0155023
17	.96389	3.2552	.90154	.0222906	60	.85594	3.2304	.71756	.0153406
18	.96153	3.2546	.90326	.0221290	61	.85325	3.2298	.71988	.0151790
19	.95914	3.2540	.90499	.0219674	62	.85056	3.2293	.72219	.0150174
20	.95675	3.2534	.90671	.0218058	63	.84784	3.2287	.72449	.0148558
21	.95435	3.2528	.90843	.0216441	64	.84511	3.2281	.72679	.0146941
22	.95193	3.2522	.91014	.0214825	65	.84235	3.2276	.72907	.0145325
23	.94951	3.2516	.91185	.0213209	66	.83958	3.2270	.73135	.0143709
24	.94707	3.2511	.91355	.0211593	67	.83678	3.2264	.73362	.0142093
25	.94463	3.2505	.91525	.0209976	68	.83396	3.2259	.73588	.0140476
26	.94218	3.2499	.91694	.0208360	69	.83112	3.2253	.73814	.0138860
27	.93972	3.2493	.91863	.0206744	70	.82825	3.2247	.74040	.0137244
28	.93726	3.2487	.92031	.0205127	71	.82536	3.2241	.74265	.0135627
29	.93479	3.2481	.92198	.0203511	72	.82244	3.2235	.74490	.0134011
30	.93231	3.2475	.92364	.0201895	73	.81949	3.2229	.74715	.0132395
31	.92983	3.2469	.64003	.0200279	74	.81651	3.2224	.74939	.0130779
32	.92735	3.2463	.64322	.0198662	75	.81350	3.2218	.75164	.0129162
33	.92486	3.2457	.64636	.0197046	76	.81046	3.2212	.75388	.0127546
34	.92237	3.2451	.64944	.0195430	77	.80739	3.2206	.75613	.0125930
35	.91988	3.2446	.65248	.0193813	78	.80429	3.2200	.75838	.0124313
36	.91738	3.2440	.65548	.0192197	79	.80115	3.2194	.76062	.0122697
37	.91488	3.2434	.65843	.0190581	80	.79798	3.2188	.76287	.0121081
38	.91238	3.2428	.66134	.0188965	81	.79477	3.2181	.76512	.0119465
39	.90987	3.2422	.66421	.0187348	82	.79153	3.2175	.76737	.0117848
40	.90736	3.2417	.66703	.0185732	83	.78825	3.2169	.76962	.0116232
41	.90485	3.2411	.66983	.0184116	84	.78494	3.2163	.77188	.0114616
42	.90233	3.2405	.67258	.0182500	85	.78158	3.2157	.77413	.0113000

DIMENSIONS OF CONSTANT GRADIENT ACCELERATOR SECTION

(t = 0.230")

$2\pi/3$ Mode, 86 Cavities, τ = 0.40

CAVITY	2A	2B	H	GROUP VEL. v_g/c	CAVITY	2A	2B	H	GROUP VEL. v_g/c
0	1.0977	3.3052	.72693	.0250383	43	.99844	3.2750	.83110	.0180883
1	1.0955	3.3045	.72979	.0248767	44	.99590	3.2743	.83328	.0179267
2	1.0933	3.3038	.73261	.0247151	45	.99336	3.2736	.83545	.0177651
3	1.0911	3.3030	.73540	.0245534	46	.99079	3.2729	.83761	.0176034
4	1.0889	3.3023	.73816	.0243918	47	.98821	3.2722	.83977	.0174418
5	1.0867	3.3015	.74089	.0242302	48	.98562	3.2715	.84193	.0172802
6	1.0845	3.3008	.74359	.0240686	49	.98300	3.2708	.84409	.0171186
7	1.0823	3.3001	.74627	.0239069	50	.98038	3.2701	.84624	.0169569
8	1.0801	3.2994	.74891	.0237453	51	.97773	3.2694	.84839	.0167953
9	1.0779	3.2987	.75154	.0235837	52	.97507	3.2686	.85053	.0166337
10	1.0757	3.2979	.75413	.0234220	53	.97238	3.2679	.85268	.0164720
11	1.0735	3.2972	.75671	.0232604	54	.96968	3.2672	.85482	.0163104
12	1.0712	3.2965	.75926	.0230988	55	.96696	3.2665	.85696	.0161488
13	1.0690	3.2958	.76179	.0229372	56	.96423	3.2658	.85909	.0159872
14	1.0668	3.2951	.76430	.0227755	57	.96147	3.2651	.86123	.0158255
15	1.0645	3.2944	.76679	.0226139	58	.95869	3.2643	.86336	.0156639
16	1.0623	3.2937	.76926	.0224523	59	.95590	3.2636	.86549	.0155023
17	1.0600	3.2930	.77171	.0222906	60	.95308	3.2629	.86763	.0153406
18	1.0578	3.2923	.77415	.0221290	61	.95024	3.2622	.86976	.0151790
19	1.0555	3.2916	.77657	.0219674	62	.94738	3.2614	.87189	.0150174
20	1.0533	3.2909	.77897	.0218058	63	.94450	3.2607	.87402	.0148558
21	1.0510	3.2902	.78136	.0216441	64	.94160	3.2599	.87615	.0146941
22	1.0487	3.2895	.78373	.0214825	65	.93867	3.2592	.87828	.0145325
23	1.0464	3.2888	.78609	.0213209	66	.93572	3.2585	.88041	.0143709
24	1.0441	3.2881	.78844	.0211593	67	.93275	3.2577	.88254	.0142093
25	1.0418	3.2874	.79077	.0209976	68	.92976	3.2570	.59008	.0140476
26	1.0395	3.2867	.79309	.0208360	69	.92674	3.2562	.59421	.0138860
27	1.0371	3.2860	.79540	.0206744	70	.92370	3.2554	.59827	.0137244
28	1.0348	3.2853	.79770	.0205127	71	.92063	3.2547	.60229	.0135627
29	1.0325	3.2847	.79998	.0203511	72	.91754	3.2539	.60625	.0134011
30	1.0301	3.2840	.80226	.0201895	73	.91442	3.2532	.61017	.0132395
31	1.0277	3.2833	.80452	.0200279	74	.91128	3.2524	.61404	.0130779
32	1.0254	3.2826	.80676	.0198662	75	.90811	3.2516	.61788	.0129162
33	1.0230	3.2819	.80903	.0197046	76	.90492	3.2508	.62167	.0127546
34	1.0206	3.2812	.81127	.0195430	77	.90169	3.2501	.62542	.0125930
35	1.0182	3.2805	.81350	.0193813	78	.89844	3.2493	.62914	.0124313
36	1.0157	3.2798	.81572	.0192197	79	.89517	3.2485	.63283	.0122697
37	1.0133	3.2791	.81794	.0190581	80	.89186	3.2477	.63648	.0121081
38	1.0108	3.2784	.82015	.0188965	81	.88853	3.2469	.64010	.0119465
39	1.0084	3.2778	.82235	.0187348	82	.88517	3.2461	.64370	.0117848
40	1.0059	3.2771	.82455	.0185732	83	.88178	3.2453	.64726	.0116232
41	1.0034	3.2764	.82674	.0184116	84	.87835	3.2445	.65080	.0114616
42	1.0009	3.2757	.82892	.0182500	85	.87490	3.2437	.65431	.0113000

k_{π}

k_{I}