Solid target simulation

- If we are aiming at the 1 kHz event rates. The target thickness should be about 0.78 × 10¹⁸ C atoms/cm² (10 nA beam current)
- Turn off some central modules can lower the rates significantly, thus the target thickness can be increased

Previous simulation results

- 0.1 mm thick disk, target thickness 6.022 × 10²¹ atoms/cm²
- Incident electron 10⁸, equivalent to 1/625 second
- Triggered events: 12448, rate is 7.78 MHz



- 2 rounds of central modules are turned off in the simulation (no readout)
- The turned off modules are marked as red



- 0.1 mm thick disk, target thickness 6.022 × 10²¹ atoms/cm²
- Incident electron 10⁸, equivalent to 1/625 second
- Triggered events: 6018, rate is 3.76 MHz



- Turn off 3 rounds
- Rate drops to 2.02 MHz

Reconstructed Hits on HyCal



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124	¢ G12	5 G12	26	G12	7 G	128	G	129	G1	30	G1.	31	G13	2 (G13.	3 (5134	F G	135	G1	136	G1	37	G1	38	G13	9	5140	0 0	141	G	142	G1	43	G1	44	G14	5 G1	46	G14
15-	4 G15	5 G15	6	G15	7 G	158	G	159	G1	60	G1	51	G16	2	316	3 0	6164	F G	165	G	66	G1	67	G1	68	G16	9	G170		171	G	172	G1	73	G1	74	G17	5 G1	76	G17
	G185	G186	1 35	2 W 36	3 37	4 18 38	5 W 39	6 10	7 ₩ 41	8	9 43	10 8 44	11 ¥ 45	12	13 # 47	14 80	15 18 49	14 ¥ 50	17 51	18 V 52	19 8 53	20 ¥ 54	21 N 55	- 22 W 56	2.8 9.7	24 18 58	25 W 59	26 # 60	27 W	28 # 62	28 ¥ 63	30 84	31 ¥ 85	3.2 N 65	33 # 87	34 8 60	620	5 02	0.6	
	G215	G216	80 80	W 26	¥ 71	72	73	74	¥ 25	76	¥ 77	N 78 N	¥ 29	N 80	# 61	82 842	2 2	¥ 84	*	¥ 86	87 87	* 65	N 50	90 90	91 81	92 9	พ ม พ	94	¥ 95 ¥	96	97	98 98	¥ 99	N 100	101	102	020.	5 020	00	021
t	0245	0246	103 N 137	104 W 138	105 W 138	106 # 140	107 W 141	108 W 142	109 W 143	110 # 144	111 W 545	112 N 146	115 W 147	114 W 143	115 H 149	116 150	117 # 151	118 ¥ 152	119 # 153	120 W 154	121 # 155	122 W 156	123 W 157	124 W 158	125 W 158	126 # 160	127 W 161	128 H 162	129 W 163	130 # 164	131 ¥ 165	132 N 196	133 W 167	134 W 168	135 # 169	1.56 H 170	G23	5 G23	36	G23
+	6245	6240	171 171	# 172	* 173	174	175 1	# 176	¥ 177	178. 178	* 179	180 18	* 181	182	183	184 184	- 185 1	* 186	187	¥ 168	* 180	* 190	N 191	W 182	193	- 194	W 195 W		¥ 197	198	* 199	200	9 201 9	* 200	203	204	G26	5 G2	66	G26
4	G275	G276	205	206 W 240	207 W 241	208 # 242	209 W 245	210 #	211 W 245	212 # 246	213 W 247	214 N 245	215 W 249	214 W 350	217 # 254	218 N 257	219 # 25.5	220 ¥ 254	221 # 295	222 W 256	223 # 257	224 ¥ 258	225 W 359	226 W 260	227 W 281	226 14 262	229 W 265	230 #	231 W 265	252 # 266	233 ¥ 267	2.54 H 2.55	235 ¥	238 W 279	237 # 271	2.58 H 272	G29	5 G2	96	G29
•	G305	G306	273	W 234	N 275	# 216	¥ 277	и 278	¥ 279	H 280	¥ 281	N 281	¥ 285	N 284	# 286	N 206	4 287	¥ 298	# 285	¥ 290	291	¥ 282	N 293	W 294	N 295	296	W 297	# 296	¥ 299	500	9 501	302	¥ 303	N 304	505	306	032	5 03	26	C 3'
	G335	G336	307	308	308 W 341	310 #	311	312 W	313 W 347	314 #	315 W	316 8 300	317 ¥	3/8	319 #	320	321 #	322 W	323 #	534 V	325	325 W	327	528 W 342	329	330	331 W	332 #	3.33 W 367	334 #	335 ¥	336 11 170	332 W 121	3.38 W 3.72	330 # 373	340	652	5 03.	20	552
1	0.745		375	W 376	* 397	# 518	W 379	# 380	¥ 381	# 582	¥ 383	11 .584	¥ 585	N 365	# 587	N 300	* 389	¥ 390	H 391	¥ 512	# .993	¥ 394	N 395	W 394	397	* 398	W 300	400	+01	402	405	N 404	¥ 405	N 406	407	# 408	G35	5 G3	56	G3:
+	6365	6366	409 N	410	411 N	412	413 W	454	415 W	416 H	417	418 N	419 W	420 N	421	422	415	s. V		435				430 W	451	432	435 W	434 8	4.55 W	456	457	438	439	440 N	441 H	442 N	G38	5 G3	86	G38
4	G395	G396	477	428		480	481	482	483	-	485	486	487	488	480	2	Ŕ	\widehat{X}	X	R	\mathbb{R}	Ŕ	$\widehat{\mathbf{X}}$			* 500	901	562	* 103	8004	505	804 908	507	508	509	510	G41	5 G4	16	G41
	G425	G426	511	512	513	314	515	616	517	618	519	620	521	522	523	Ş	Ŷ	X	X	X	Ş	Ą	Ŕ	532	5.53	534	5.55	636	5.57	6.58	539	540	541	542	54.5	544				
	G455	G456	N 579	# 580	N 501	940 9 582	W 505	и 084	¥ 585	H 685	¥ 587	N 665	¥ 589	508 N 590	H 591	$\widehat{\mathbf{X}}$	Ŷ	Ŷ			R	2	\square	900 W 500	N 601	# 502	w 605	H 604	¥ 605	# 606	¥ 607	N 605	¥ 609	N 610	# \$11	N 612	644	5 044	40	
1			613	814	613 W	816 #	617 W	410 91	819 W	620	421 ¥	622	623 V	624 N	-	Ş	Ş	Ş	Ş	Ş	Ş	Ş	Ŕ	834 87	6.33	636	4 6.37 W	633 F	6.39 V	640 #	641 ¥	442	643 W	644 8	845 8	846 8	G47	5 G4	76	G47
+	6485	G486	647 N 661	840 840 840	649 W 663	850 # 884	901 W 985	80.2 # 686	653 W 687	604 # 668	400 ¥ 489	806 8 690	837 881	608 N 662	859 H 693	2	Ż	$\widehat{\mathbf{X}}$	$\widehat{\mathbf{X}}$	\widehat{X}	$\widehat{\times}$	$\widehat{\mathbf{X}}$	Ŕ	868 W 702	000 N 703	870 # 794	871 W 705	672 # 706	¥ 307	674 # 708	675 ¥ 709	676 N 710	¥ 711	878 W 712	879 # 713	800 8 714	G50	5 G5	06	G50
4	G515	G516	715	W 716 W	717	718	9 719 9	720	721 V	722	723 ¥	724	725	728 W	727	728 N	729	* 730 *	751	¥ 732	753	734 ¥	N 735 N	W 736 W	757	738	W 759 W	740	¥ 341	742	743	944 1	745 ¥	N 748 N	747	248 N	G53	5 65	36	G53
	G545	G546	749 # 783	750 754	751 * 785	752 # 786	75.5 ** 787	754 # 788	258 789	756	767 * 791	758 * 792	750 W 795	760 W 754	761 # 795	762 * 796	76.3 * 797	264 798	765 # 798	766 ¥ 800	767 # #01	768 ¥ 802	799 # 803	770 # 804	771 * 805	712 # 806	775 ** 807	774 # 808	775 809	776 # 810	777 #11	778 # #12	779 ¥13	700 # 814	781 # 815	782 810	OFE			
,	G575	G576	817	418 W	813 813	#20	4 821 4	# #22	4 123 1	824 824	* 825 *	826	* 427 *	828 828	# 429	8.50 *	431 *	* 832 *	833 #	* 834 *	835 8	436 ¥	8 837 8	838 W	8.30 W	840 *	4 541 1	842 8	¥ 843 ¥	844	4 845 4	846 8	¥ 807 ¥	848 848	840 840	860	636	5 65	00	500
1			851 985	#52 # #86	853 N 567	854 8 680	#55 W \$69	#56 # #90	857 991	858 H 692	859 ¥ 893	860 10 694	851 W 855	842 N 895	863 8 897	864 8 998	865 18 899	866 900	867 H 901	868 ¥ 902	869 903	870 904	871 N 905	872 W 906	873 907	874 908	875 W 909	874 910	877 911	878 912	879 ¥ 913	880 N 114	884 915	NH2 N \$16	86.5 917	804 918	G59	5 G55	96	G59
+	6605	6606	8119 8	# 120 #	8 921 8	922	4 925 4	и 924 И	¥ 125	926 H	¥ 927 ¥	826 8	¥ 929 ¥	N 130 N	931 #	9.52 9	923 9	¥ 134	935 #	¥ 9.55 ¥	8 9.57 8	* 938 *	N 529 N	840 840	8 541 8	942 8	w 943 W		* #3	946	947 947	8 948 8	*	N 150 N	451 #	8 952 8	G62	5 G6	26	G62
4	G635	G636	\$53 H \$87	904 W 988	\$55 N \$69	956 # 990	957 W 991	958 # 982	900 W 933	960 # 994	961 ¥ 955	952 N 995	963 ¥ 997	954 N 998	965 # 959	966 # 1000	967 # 1001	948 1002	965 H 1003	\$70 ¥ 1004	971 N 1009	972 ¥ 1006	\$73 W 1007	934 W 1008	875 N 1009	976 # 1010	977 W 1011	978 H 1012	979 W 1013	980 # 1014	981 ¥ 1015	982 H 1016	983 ¥ 1017	584 N 1018	985 # 1019	966 N 1020	G65	5 G6	56	G65
	G665	G666	N 1021 N	W 1022	N 1023	# 1024 #	и 1025 и	и 1025 и	¥ 1627 ¥	# 1038	¥ 1029 ¥	1030 1	¥ 1051 ¥	N 1032 N	# 1033 #	N 1054	# 10.55	¥ 1036 ¥	# 1837 #	¥ 1038 ¥	1039 1	¥ 1040 ¥	N 1041 N	W 1042	1043 N	1044	W 1045 W	и 1045 и	¥ 1047	1048	1049 V	1050	¥ 1051 ¥	N 1052 N	1053	N 1054 N				
,	G695	G696	1056 N 1089	1056 W 1090	1057 W 1091	1056	1058 W 1093	1060 W 1094	1061 W 1095	1062 H 1095	1063 ¥ 1097	1064 N 1098	1065 W 1099	1066 N 1100	1067 H 1101	1068 N 1102	1069 4 1103	1070 ¥ 1104	1871 # 1105	1672 ¥ 1105	1075 N 1107	1074 W 1108	1075 W 1109	1076 W 1110	1677 N 1111	1078 1112	1079 W 1113	1080 # 1114	1081 W 1115	1082 # 1115	1083 V 1117	1084 N 1118	1085 W 1119	1086 W 1120	1087	1088 N 1122	666	5 66	50	500
+			1123	W 1124	¥ 1125	1126	W 1127	1128	W 1129	1130	¥ 1131	1132	¥ 1133	N 1134	# 11,35	N 1136	11,07	¥ 1138	# 1139	¥ 1140	N 1141	¥ 1142	1143	W 1144	1145	и 1146	W 1147	и 1148	W 1149	1150	¥ 1151	1152	¥ 1153	N 1154	1155	N 1156	G71	5 G7	16	G71
+	G725	6726	G7	27	G72	8	372	9 G	730	G	731	G7	32	G7.	33	G73	54	G73	5 0	573e	5 G	737	G	738	G7	739	G7	40	G74	1 (574	2 0	743	5 G	744	G7	45	G746	G7	47
ı İ	G755	G756																														Τ		Τ						

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- Turn off 4 rounds
- Rate drops to 1.30 MHz



Reconstructed Hits



Reconstructed Hits on HyCal

Summary

- Turning off some modules in the center part can significantly lower the rates
- By turning off 4 rounds of the modules (min scat. angle 1.6 degree), we have gained a factor of 6