HyCal Trigger Efficiency

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PRIMEX note 73

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1 Trigger Efficiency

One component of π^0 detection efficiency is HyCal trigger efficiency. HyCal trigger was generated in case if total energy deposition in HyCal exceeded certain value. The goal of this analysis is to extract probability of HyCal trigger to appear in case if we have certain energy deposition in HyCal, which is the definition of HYCAL trigger efficiency (as a function of deposited in HYCAL energy).

Trigger efficiency was obtained from 2nd Snake Scan data.

The following cuts were applied to select data for analysis:

1) exactly one hit in TRIGTHIT bank with id=1 (MOR) and time within ±20ns

banks->TRIGTHIT -> trigthit[i].id==1;
abs(banks->TRIGTHIT -> trigthit[i].t)<20;

2) exactly one cluster in calorimeter with energy between 0.8 and 8.0 GeV

banks->HYCALCLUSTER -> bank.nrow==1;
0.8 GeV < banks->HYCALCLUSTER->hycalcluster[i].E < 8.0 GeV;

3) exactly one reconstructed TAGGER hit within ±20ns time

banks->TAGM_LR->bank.nrow==1;
abs(banks->TAGM_LR->tagm_lr[i].t)<20;

4) cluster energy corresponds tagger energy

abs(cluster_energy/tagger_energy – 1)<0.1;

5) HyCal energy corresponds cluster energy

energy_hycal - E_cl < 0.20 GeV ;

One hit in TRIGTHIT bank with id=2 and time within 20 ns was a condition for existence of HyCal trigger signal.

Most of channels have inefficiency less 0.1% when energy greater than 4.0 GeV. But several of them have reduced information in the data. On fig 1. presented HyCal

matrix with these channels (pointed yellow). For channels #1535-1540 expected run file primex2_065126.dat doesn't exist. Most files in runs 61119-65122 which expected to have statistics in channels #1647, 1681-1685, 1715-1719 are junked. For other "yellow" marked channels cut $|(1-E_{Cluster}/E_{Tagger})|<0.1$ doesn't work, because used π^0 calibration constants are different from snake calibration constants. So we changed gain factors to made calibration for these channels. Typical uncalibrated channel presented on fig. 2. In fig. 3 presented inefficiency for "good"(1100) and "bad"(1690) channel for comparison. In figures 4 and 5 presented inefficiency for channels (1571 and 1637) with enhanced inefficiency.

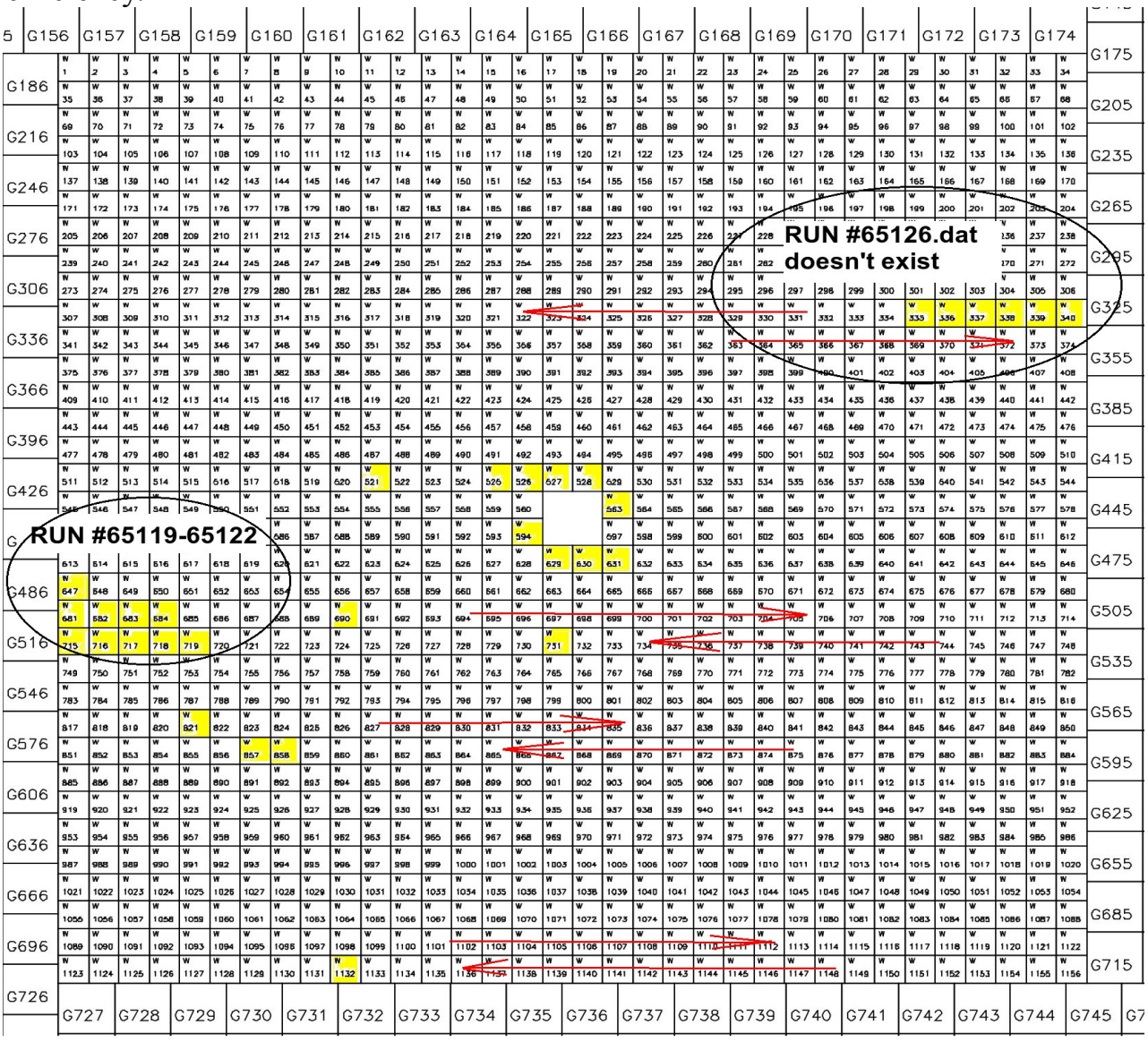

Fig. 1. HyCal matrix (central part). Red arrows – "direction" of beam, yellow pointed boxes – low statistic

These problem channels are shown in the table on the next page.

Problem channels

Channel	Description of problem
1571	reduced efficiency ~ 99.4%
1637	reduced efficiency ~70%
1690	Dead dynode

Channels with shifted gains

1521, 1525, 1527, 1528, 1563, 1594, 1629, 1630, 1631, 1731, 1821, 1857, 1858, 2132

Channels with low statistics

1526, 1630 (channels near the central hole) 1335-1340 (should be in file primex2_065126.dat which were missed) 1647, 1681-1684, 1715-1719 (should be in files in runs #65119-65122 which are mostly junk)

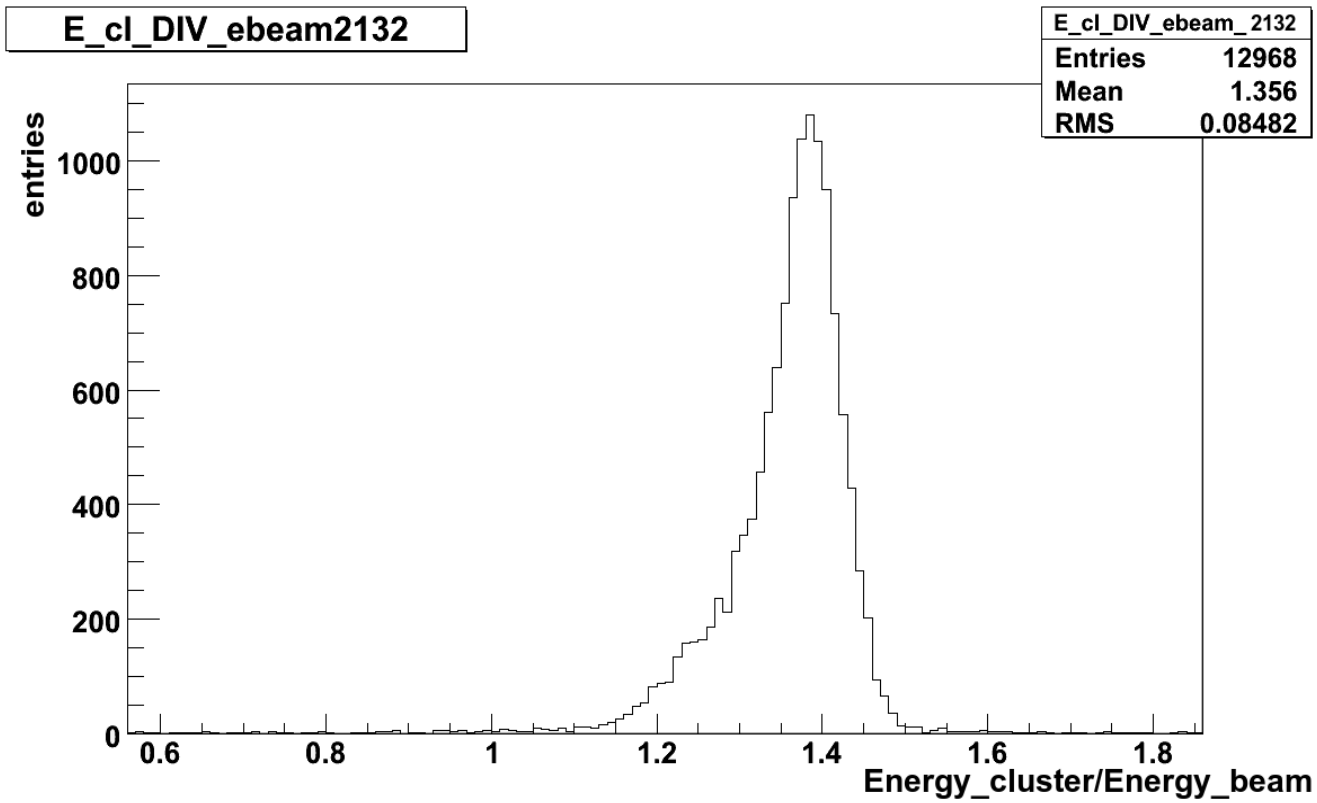

Fig. 2. Example of energy ratio spectrum with “shifted gain” (channel #2132)

In fig. 6-11 presented inefficiency for all channels for energy range 3.4÷3.7GeV, 3.7÷4.0 GeV, 4.0÷4.3 GeV, 4.3÷4.6 GeV, 4.6÷4.9 GeV, 4.9÷5.2 GeV, 5.2÷5.5 GeV correspondingly. Channels with greater inefficiency marked with red color.

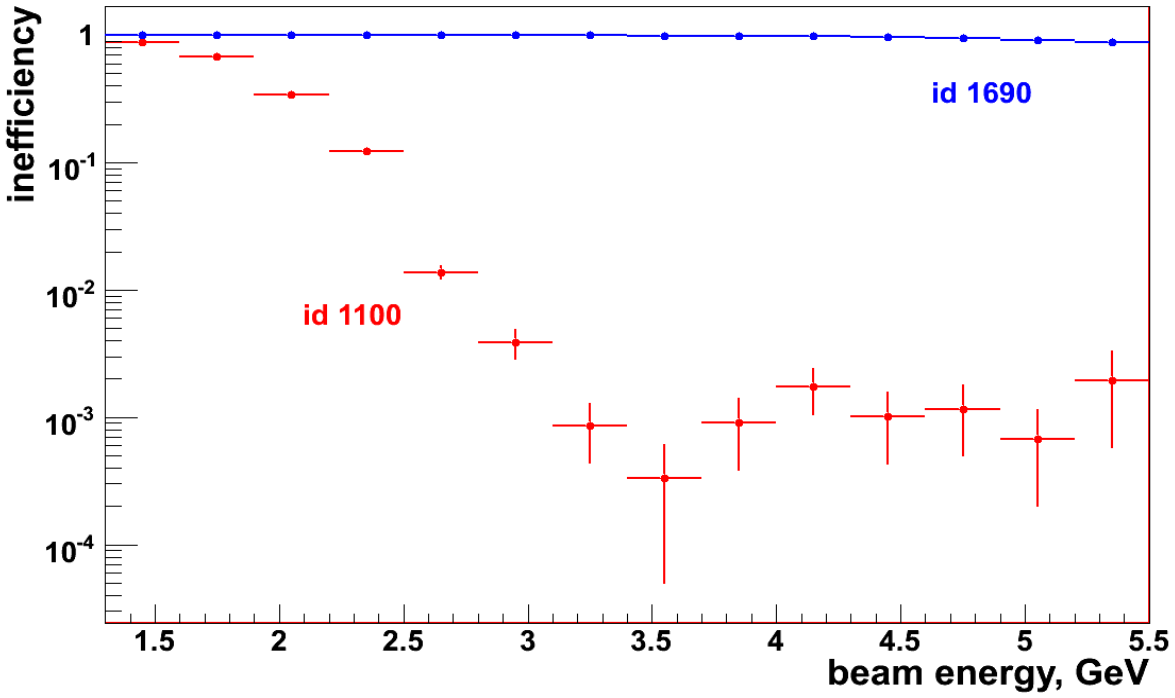

Fig. 3. Inefficiency of HyCal trigger as a function of energy for problem channel #1690 in compare with good channel #1100

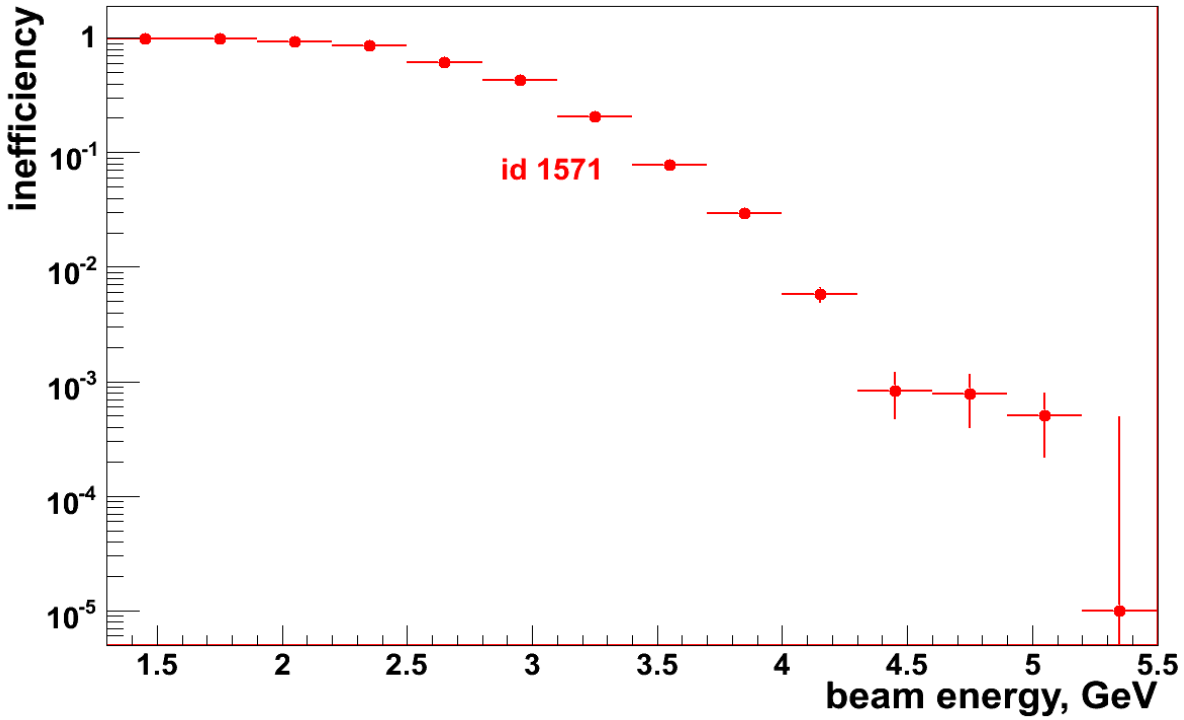

Fig. 4. Inefficiency of HyCal trigger as a function of energy for problem channel #1571

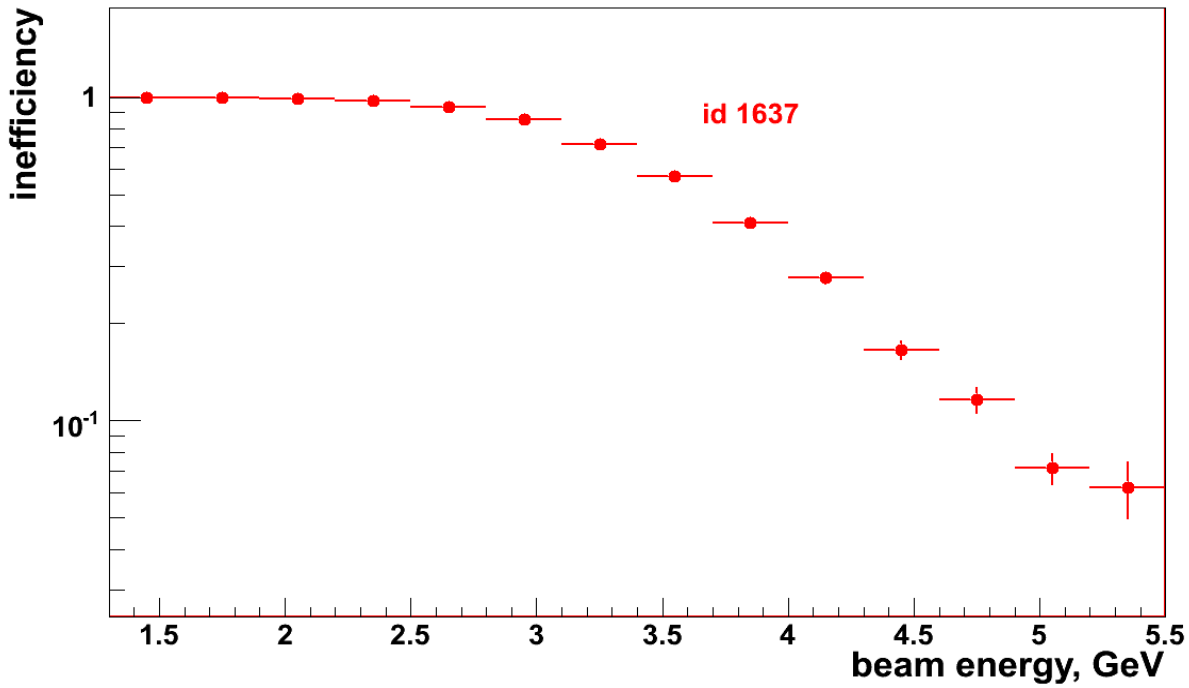

Fig. 5. Inefficiency of HyCal trigger as a function of energy for problem channel #1637

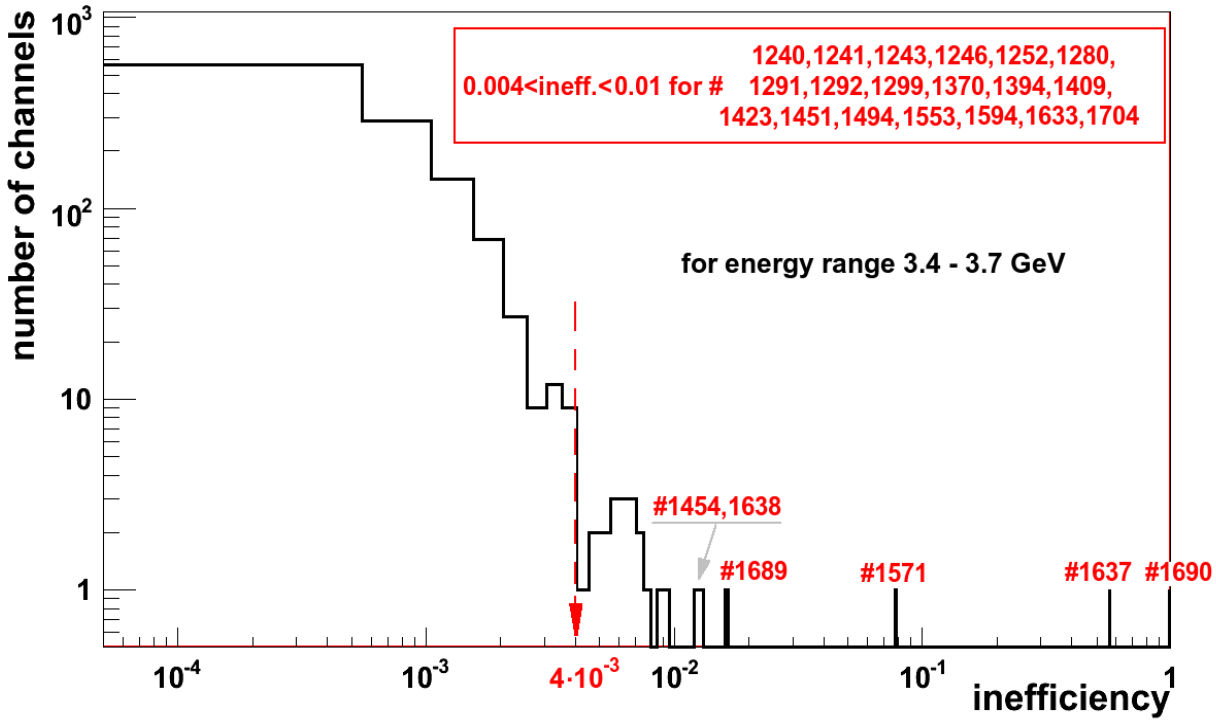

Fig. 6. Number of channels versus inefficiency for energy range 3.4-3.7 GeV

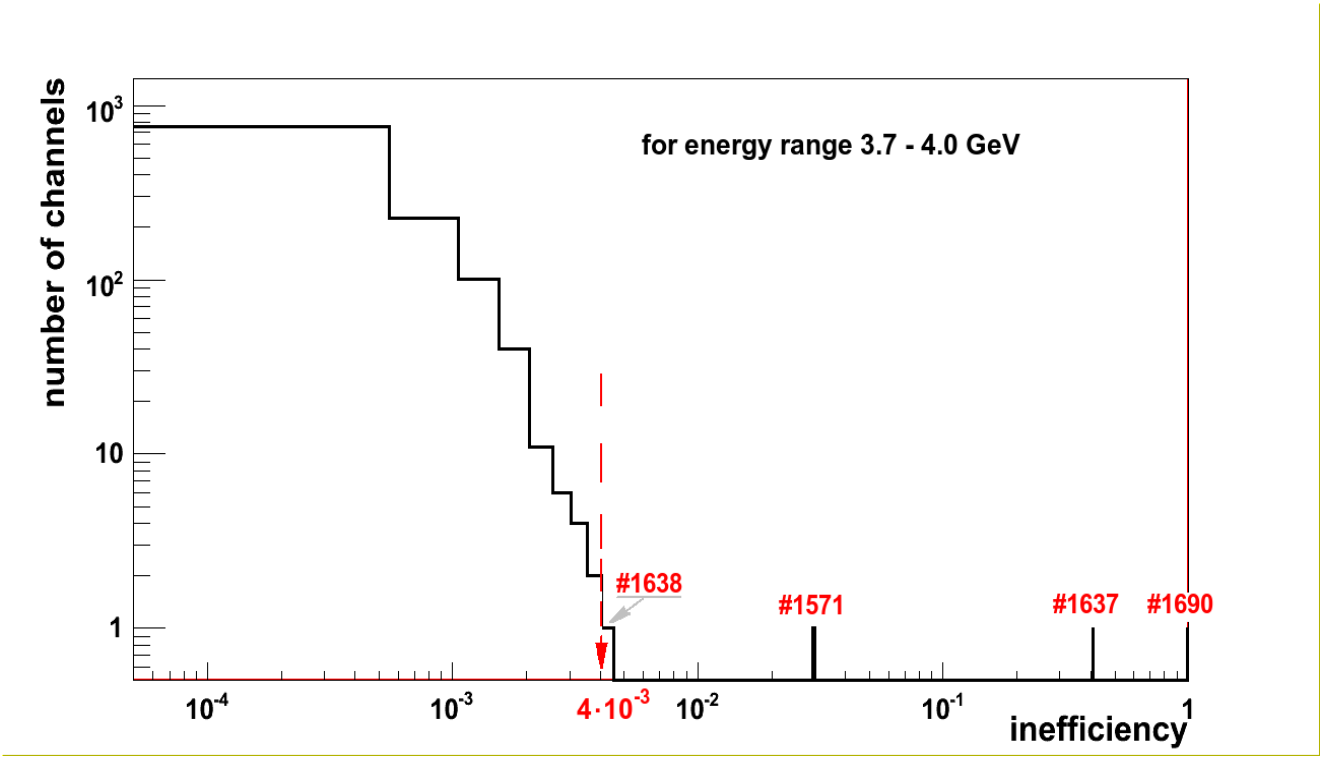

Fig. 7. Number of channels versus inefficiency for energy range 3.7-4.0 GeV

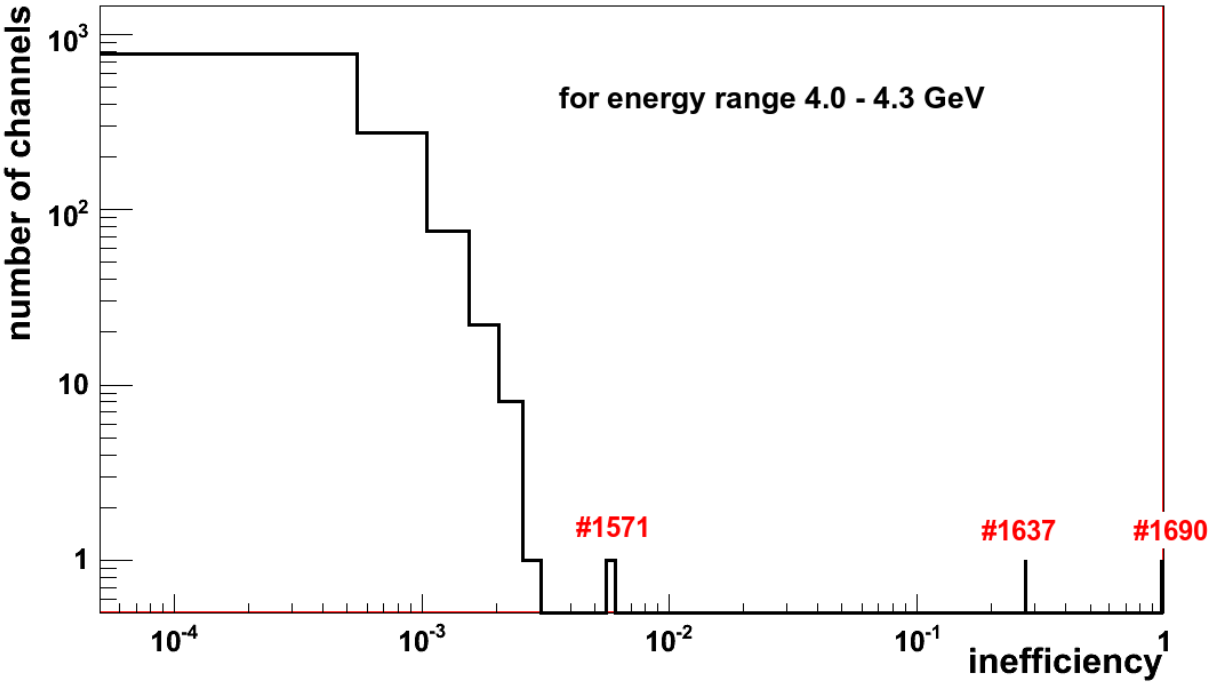

Fig. 8. Number of channels versus inefficiency for energy range 4.0-4.3 GeV

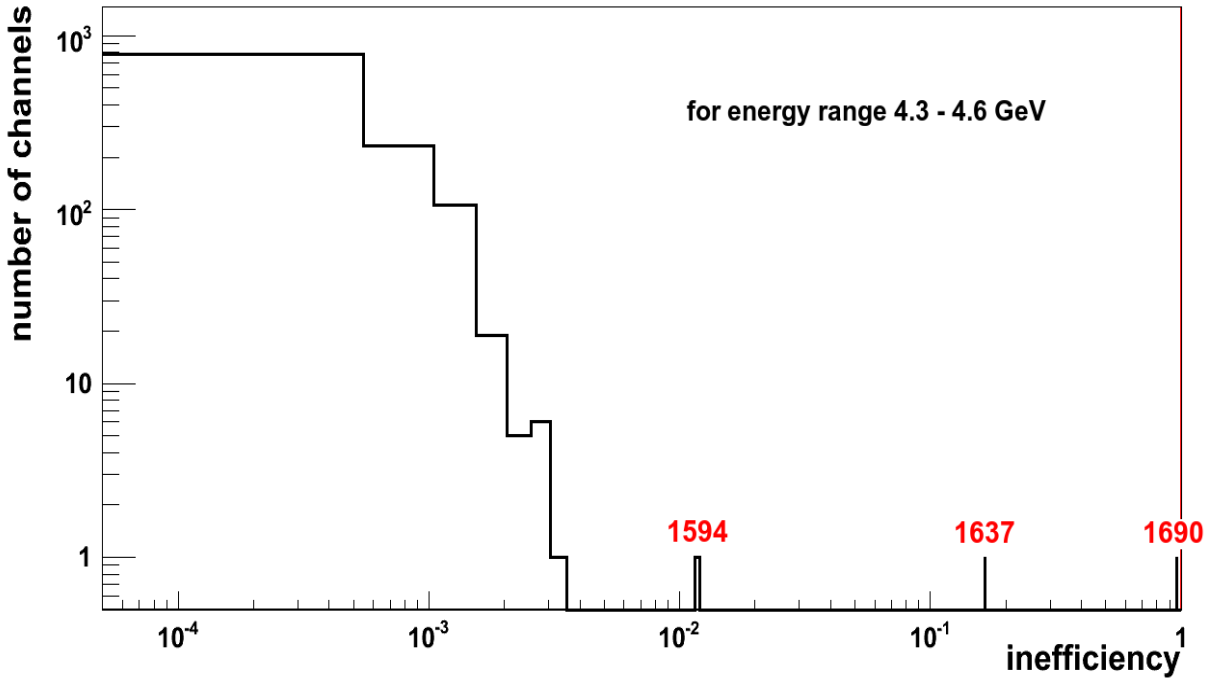

Fig. 9. Number of channels versus inefficiency for energy range 4.3-4.6 GeV

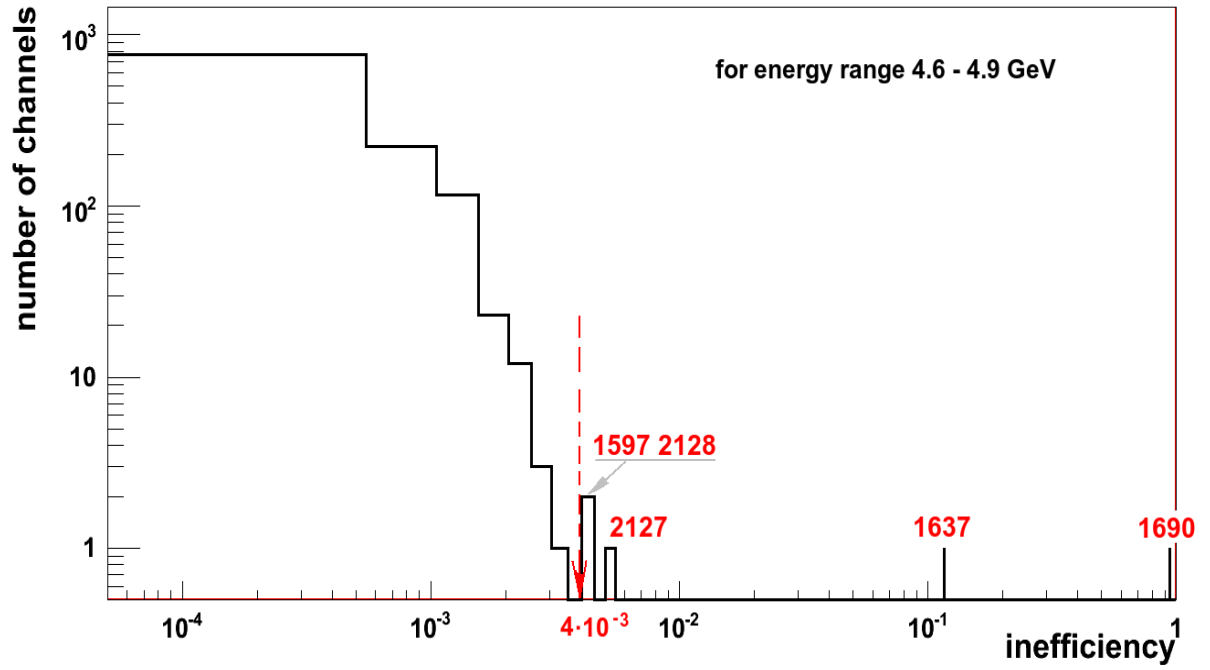

Fig. 10. Number of channels versus inefficiency for energy range 4.6-4.9 GeV

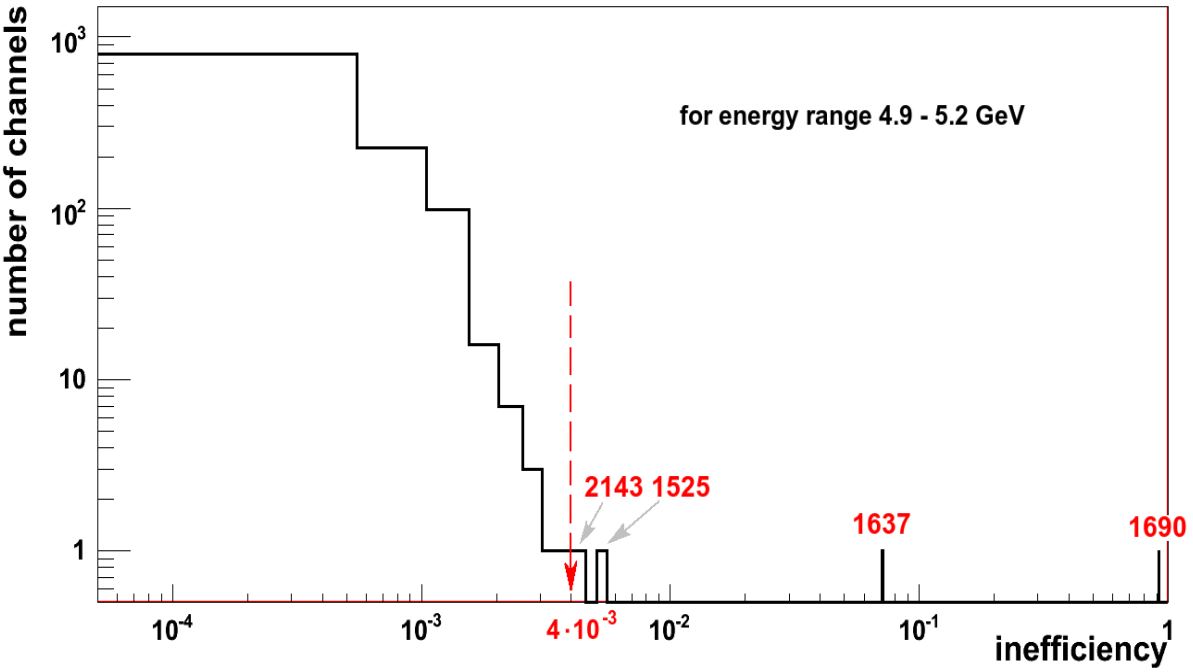

Fig. 11. Number of channels versus inefficiency for energy range 4.9-5.2 GeV

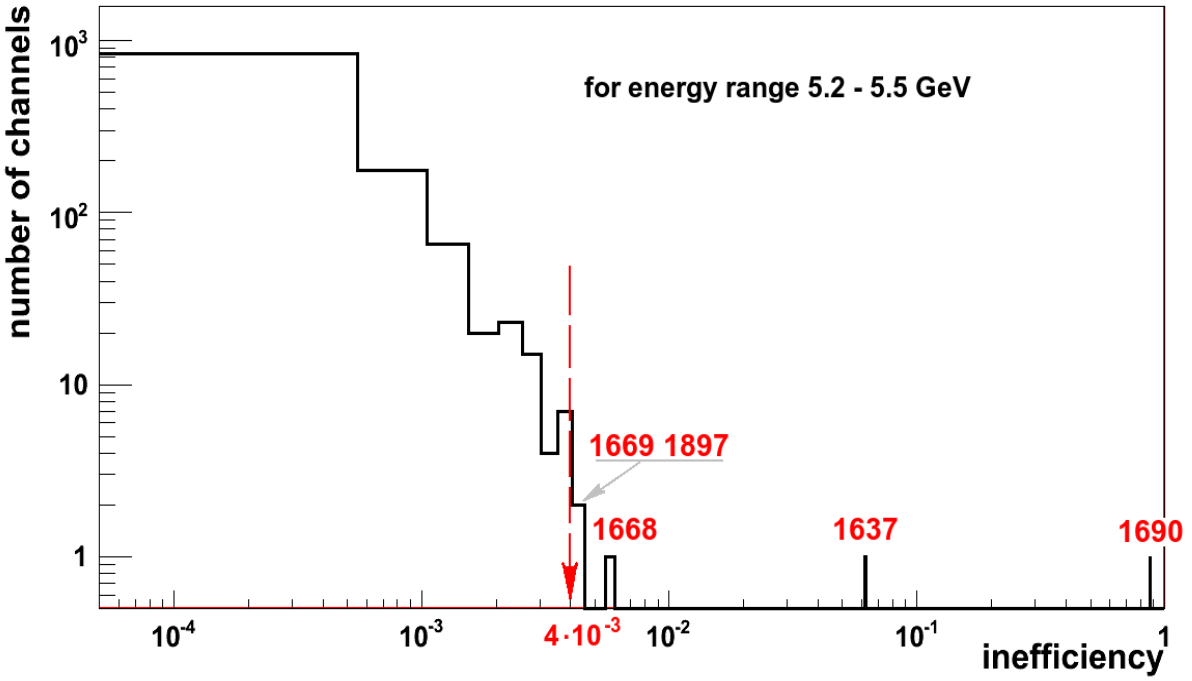

Fig. 12. Number of channels versus inefficiency for energy range 5.2-5.5 GeV

2 Timing study

Typical distribution of time difference between reconstructed TAGGER hit (from TAGM_LR) and HYCAL trigger (from TRIGTHIT) presented on fig. 13. This distribution presented when beam was focused on channel number #1418 and high energy range (T1-19).

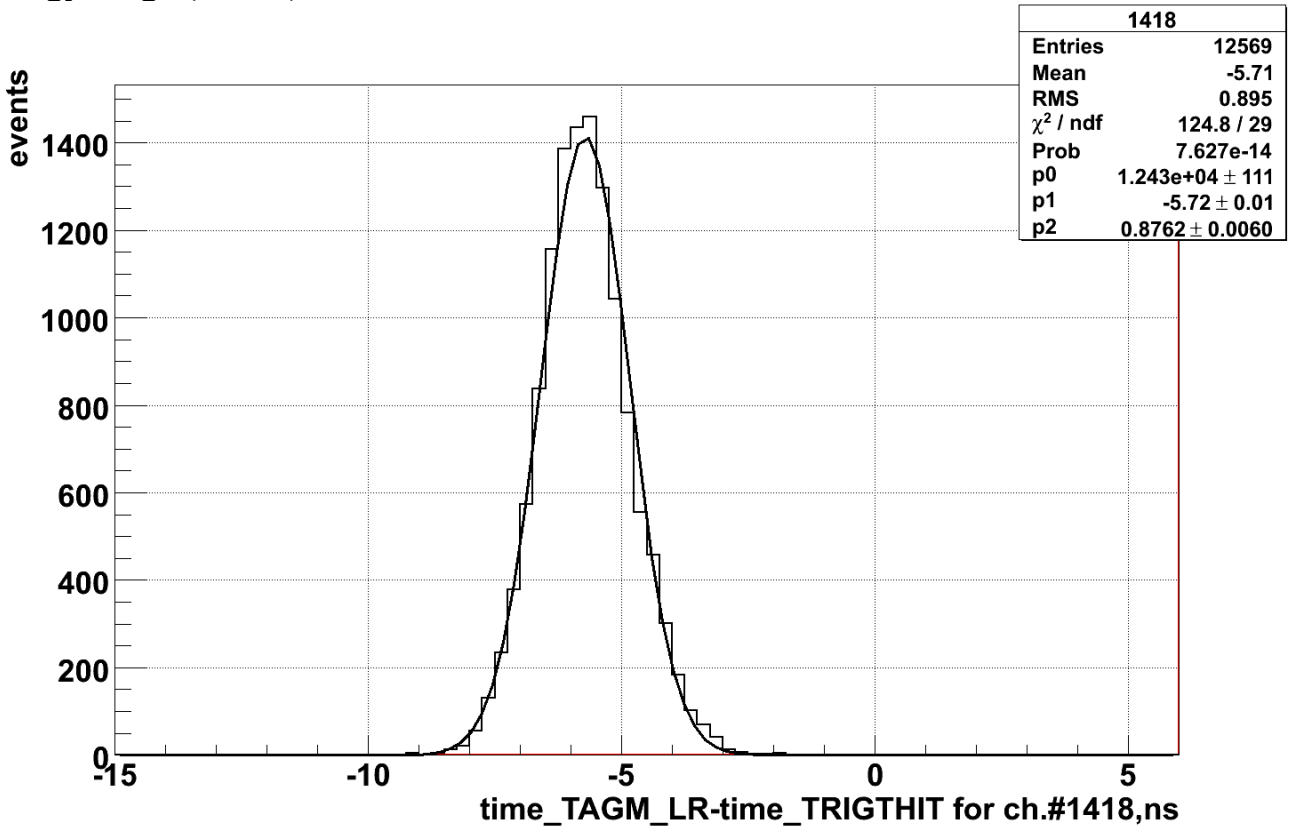

Fig. 13. Time difference (time TAGM_LR – time TRIGTHIT) for channel #1418 T1-19

Distribution was fitted with Gauss function: p0 – number of events, p1 – mean and p2 – sigma.

In fig. 10 presented distribution of peak center position for all channels (1001-2156) excluding 5 channels with no or too low statistics (1561, 1562, 1595, 1596 – central zone and 1528 which were excluded from analysis). Channels #1832 and #1690 marked red, because their values are far from mean time difference. In fig. 15 are shown errors of peak center positions for each channel. It is seen that most of errors have value not greater than 0.03ns and only several ones (channel with dead dynode #1690 and channels with low statistics 1336-1340) have values from 0.1 to 0.35 ns. In fig. 16 and 17 presented distributions for sigma value and error of sigma. Channels which have bigger that regular sigma value marked with red color. Errors here are negligible (most of them are under 0.03ns).

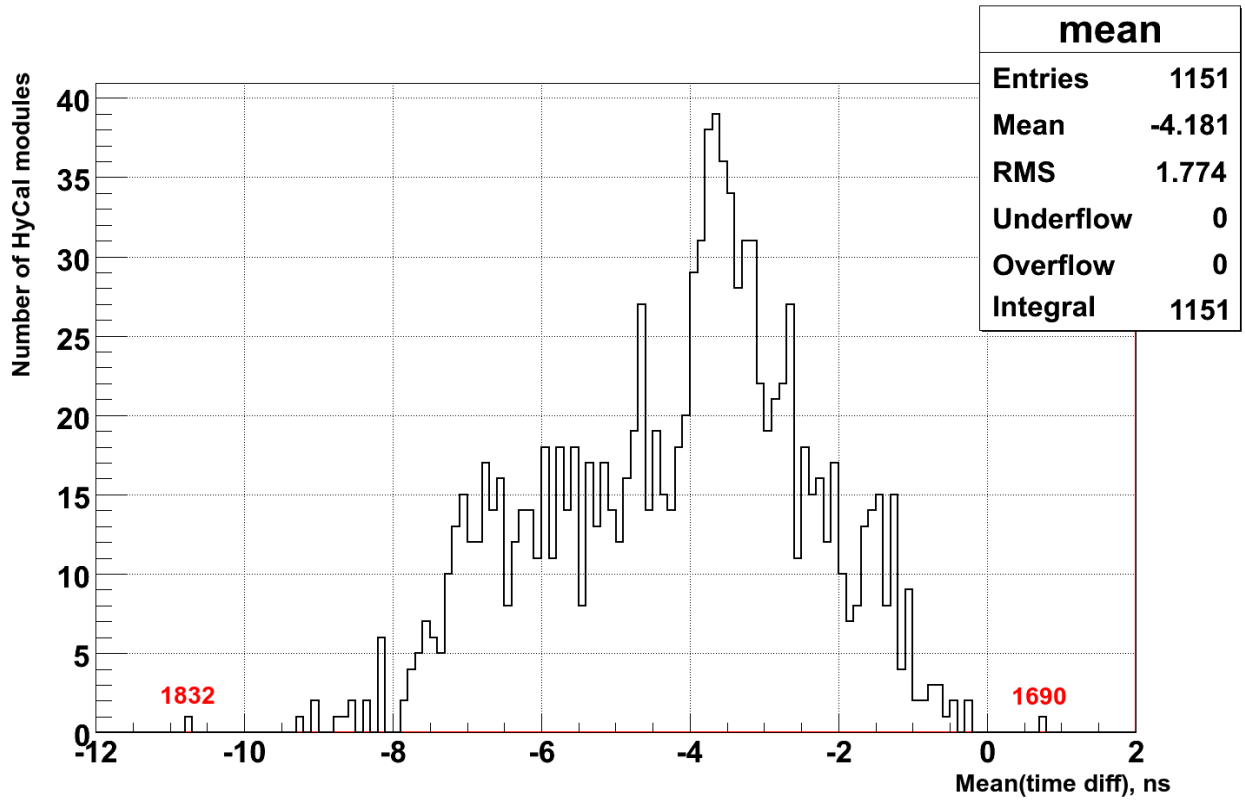

Fig. 14. Mean value of time difference from fit (TAGM_LR time – TRIGTHIT time)

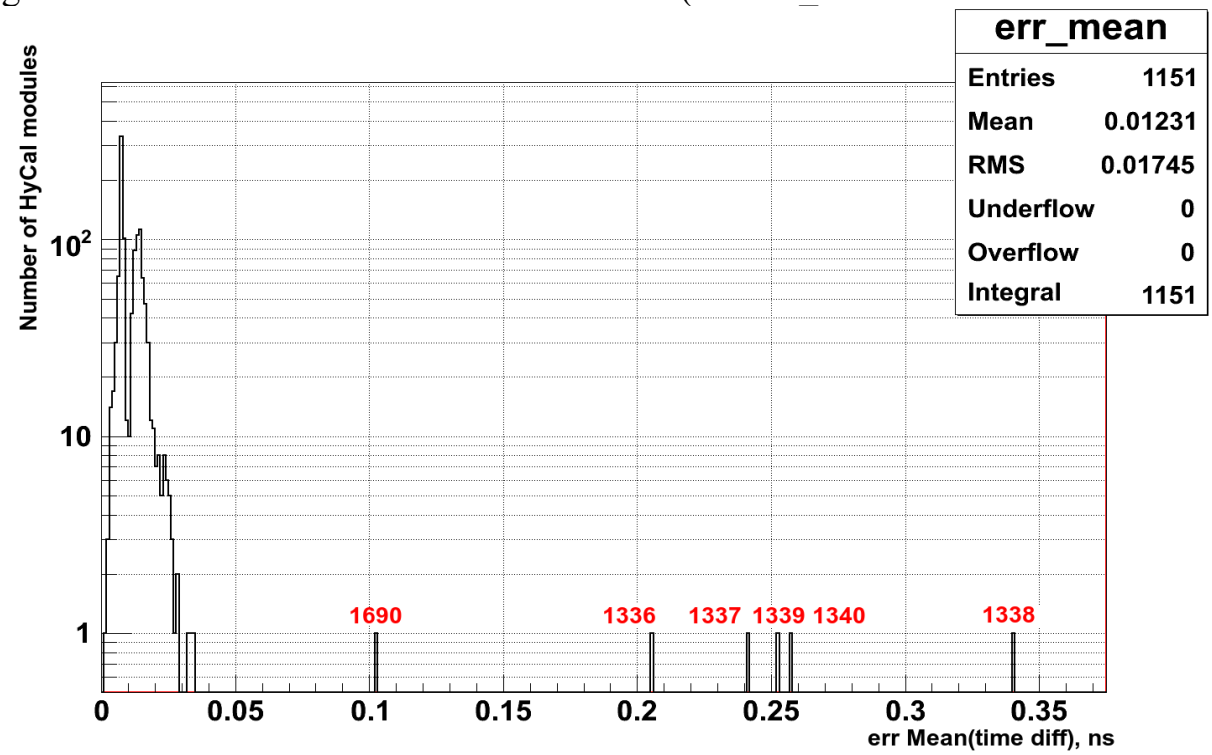

Fig. 15. Error of mean value from fit

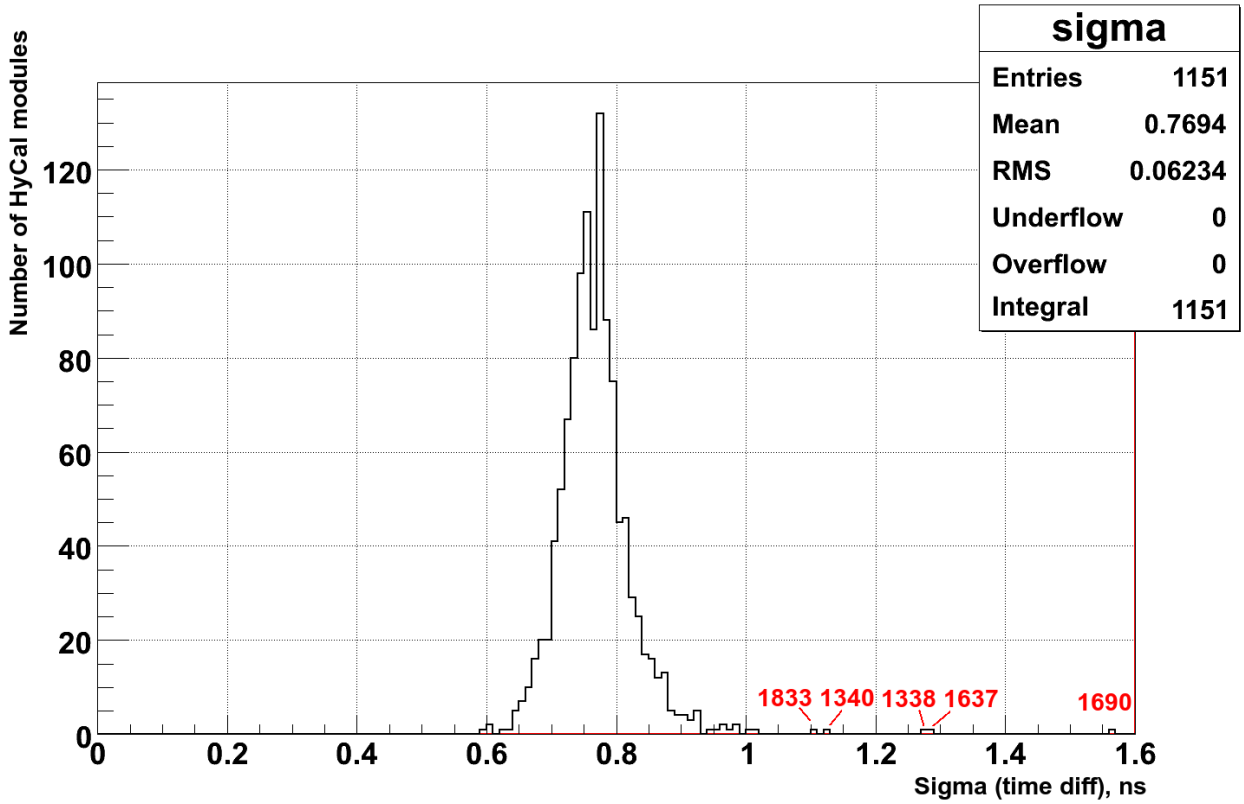

Fig. 16. Sigma value of time difference from fit (TAGM_LR time – TRIGTHIT time)

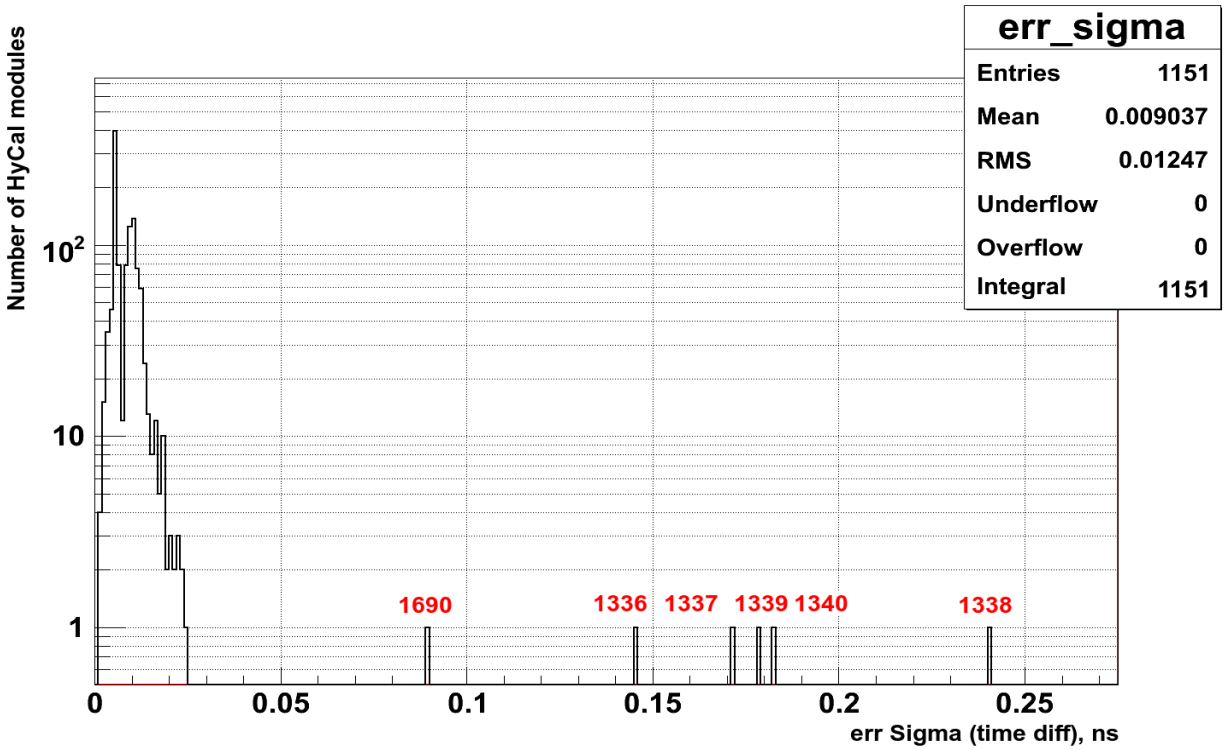

Fig. 17. Error of sigma value from fit

In fig. 18 presented available statistics for each channel (for T counters 1-19).

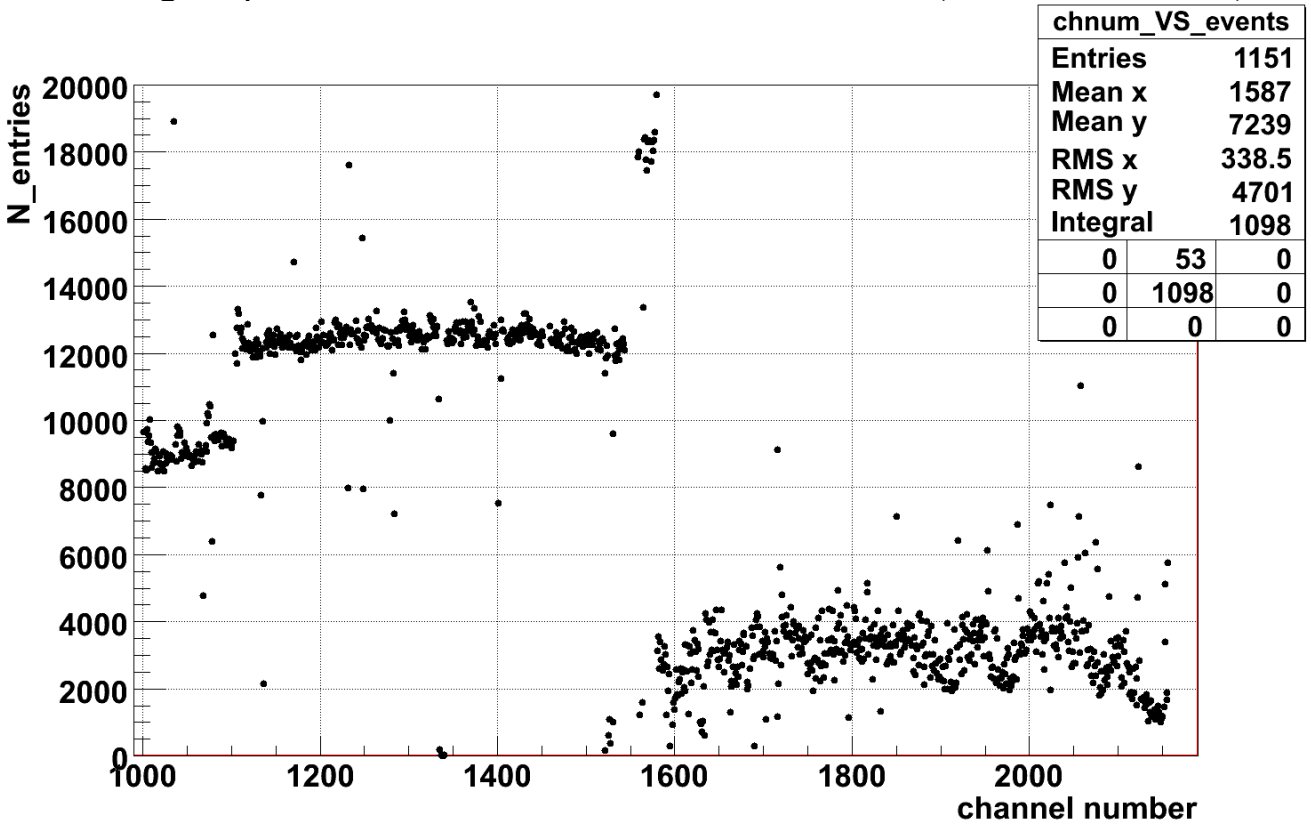

Fig. 18 Dependence between number of entries and channel number

It is seen from picture that at some points (around channel number 1100 and 1550) we had enhance and drop in statistics (if we take into consideration that beam went from bigger numbers to smaller numbers of channels, we need to look at this picture reverse). At the beginning of snake scan run was available short statistics and then at some point statistics was enhanced.

Summary

Inefficiency for the HyCal Totalsum trigger for energies greater than 4.0 GeV was found to be $\leq 0.1\%$ for majority of channels except for some problem ones: 1571, 1637, 1690 (for channel 1571 inefficiency is about 0.6%, for channel 1637 is about 30%). Channel 1690 has a dead dynode therefore we are not triggering from this module at all.

That means that we can use value of 0.1% as an upper estimation of trigger deviation from 100% (estimation of HyCal Totalsum trigger efficiency).

Position and width (and their errors) of HyCal trigger peak (time diff: TAGM_LR time – HYCAL TRIGGER time) have been obtained for each PWO module during 2nd Snake Scan for high energy T-counters. This information can be used for calculation of

tdif cut efficiency and it's error. We loaded this data into PrimEx online DB:
system = crystal; attribute = tdiff_mean, tdiff_mean_err, diff_sigma, tdiff_sigma_err
For channels with no information we put sigma = -1.

also these values are presented below:

(#chan. | entries | mean | err_mean | sigma | err_sigma)

		[ns]	*[ns]*	*[ns]*	*[ns]*
1001	9648	-4.400	0.008	0.794	0.006
1002	8558	-3.209	0.009	0.790	0.006
1003	8506	-3.095	0.008	0.744	0.006
1004	9737	-3.445	0.008	0.742	0.006
1005	9361	-3.332	0.008	0.734	0.006
1006	9558	-3.657	0.008	0.811	0.006
1007	10037	-3.355	0.008	0.756	0.006
1008	9330	-3.371	0.008	0.708	0.006
1009	8583	-3.298	0.008	0.733	0.006
1010	9038	-3.546	0.008	0.728	0.006
1011	8736	-3.455	0.008	0.770	0.006
1012	8862	-3.134	0.008	0.779	0.006
1013	9146	-2.764	0.009	0.795	0.006
1014	8754	-3.220	0.009	0.832	0.007
1015	9095	-5.710	0.009	0.787	0.007
1016	8477	-5.594	0.009	0.747	0.006
1017	8987	-4.242	0.009	0.789	0.006
1018	8716	-3.714	0.008	0.727	0.006
1019	8930	-3.991	0.008	0.739	0.006
1020	8713	-4.744	0.008	0.731	0.006
1021	8657	-5.293	0.009	0.718	0.006
1022	9070	-4.019	0.009	0.803	0.007
1023	8679	-3.421	0.009	0.786	0.007
1024	8482	-3.348	0.009	0.758	0.006
1025	8732	-3.468	0.009	0.758	0.006
1026	9009	-4.050	0.008	0.757	0.006
1027	8917	-3.551	0.009	0.830	0.007
1028	8805	-2.924	0.009	0.802	0.007
1029	8901	-3.708	0.009	0.776	0.007
1030	8822	-3.256	0.009	0.826	0.006
1031	8977	-4.889	0.009	0.803	0.007

1032	8913	-3.604	0.009	0.815	0.006
1033	8829	-3.389	0.009	0.813	0.006
1034	39600	-4.609	0.004	0.817	0.003
1035	18917	-3.481	0.006	0.769	0.004
1036	9294	-4.633	0.009	0.764	0.006
1037	8775	-3.162	0.009	0.799	0.006
1038	9824	-3.053	0.008	0.776	0.006
1039	9559	-2.776	0.008	0.777	0.006
1040	9740	-2.236	0.008	0.777	0.006
1041	9658	-2.795	0.008	0.778	0.006
1042	9562	-3.115	0.008	0.756	0.006
1043	8856	-2.904	0.009	0.771	0.006
1044	9048	-3.121	0.009	0.795	0.006
1045	8952	-2.762	0.008	0.782	0.006
1046	9026	-2.619	0.008	0.769	0.006
1047	9334	-2.516	0.008	0.789	0.006
1048	9169	-2.849	0.009	0.803	0.006
1049	9076	-4.420	0.009	0.786	0.006
1050	8943	-4.768	0.008	0.745	0.006
1051	8952	-4.110	0.009	0.757	0.006
1052	8907	-4.538	0.008	0.746	0.006
1053	8959	-4.115	0.008	0.747	0.006
1054	8947	-4.431	0.008	0.739	0.006
1055	8655	-3.801	0.009	0.765	0.006
1056	8868	-4.791	0.009	0.764	0.006
1057	8765	-4.450	0.009	0.766	0.006
1058	8903	-3.841	0.008	0.749	0.006
1059	9074	-3.425	0.008	0.742	0.006
1060	8770	-3.356	0.009	0.775	0.006
1061	9015	-3.204	0.009	0.791	0.007
1062	8771	-3.808	0.009	0.812	0.006
1063	9279	-3.968	0.008	0.763	0.006
1064	9085	-3.214	0.008	0.780	0.006
1065	9090	-3.258	0.009	0.803	0.006
1066	9001	-4.605	0.009	0.814	0.006
1067	8753	-4.652	0.009	0.806	0.007
1068	4784	-3.232	0.013	0.860	0.010
1069	22440	-2.705	0.006	0.844	0.004
1070	9266	-4.860	0.009	0.773	0.006
1071	9061	-3.689	0.009	0.775	0.006

1072	9931	-3.442	0.008	0.759	0.006
1073	10206	-3.214	0.008	0.765	0.006
1074	10124	-3.316	0.008	0.751	0.006
1075	10476	-3.396	0.008	0.752	0.006
1076	10425	-3.528	0.007	0.725	0.006
1077	9504	-3.630	0.008	0.738	0.006
1078	6391	-3.079	0.010	0.733	0.007
1079	12540	-3.245	0.007	0.751	0.005
1080	9391	-4.426	0.008	0.749	0.006
1081	9568	-3.595	0.008	0.749	0.006
1082	9562	-3.384	0.008	0.754	0.006
1083	9565	-3.567	0.008	0.765	0.006
1084	9554	-3.448	0.008	0.763	0.006
1085	9416	-2.657	0.008	0.776	0.006
1086	9544	-3.880	0.008	0.751	0.006
1087	9618	-3.771	0.008	0.723	0.006
1088	9221	-4.009	0.008	0.719	0.006
1089	9540	-3.330	0.008	0.736	0.006
1090	9614	-3.578	0.008	0.729	0.006
1091	9500	-3.838	0.008	0.750	0.006
1092	9529	-3.572	0.008	0.783	0.006
1093	9408	-3.539	0.008	0.784	0.006
1094	9374	-4.838	0.008	0.784	0.006
1095	9254	-3.579	0.008	0.779	0.006
1096	9386	-3.957	0.008	0.753	0.006
1097	9441	-3.254	0.008	0.763	0.006
1098	9362	-3.061	0.008	0.767	0.006
1099	9179	-3.647	0.008	0.736	0.006
1100	9218	-3.529	0.008	0.769	0.006
1101	9394	-3.673	0.008	0.754	0.006
1102	27782	-3.733	0.005	0.838	0.004
1103	26429	-2.672	0.005	0.822	0.004
1104	11989	-3.505	0.008	0.789	0.005
1105	11708	-3.474	0.007	0.754	0.005
1106	12748	-2.487	0.007	0.796	0.005
1107	13323	-2.693	0.007	0.809	0.005
1108	13183	-2.605	0.007	0.777	0.005
1109	12633	-3.851	0.007	0.743	0.005
1110	12763	-3.891	0.007	0.751	0.005
1111	12154	-2.921	0.007	0.774	0.005

1112	12439	-3.191	0.007	0.785	0.005
1113	12386	-2.418	0.007	0.787	0.006
1114	12322	-2.942	0.007	0.788	0.005
1115	12199	-2.780	0.007	0.752	0.005
1116	12118	-2.832	0.007	0.774	0.006
1117	12110	-2.661	0.007	0.793	0.005
1118	12858	-2.187	0.007	0.787	0.005
1119	12297	-2.543	0.007	0.769	0.005
1120	12060	-2.799	0.007	0.795	0.005
1121	12122	-3.522	0.007	0.778	0.005
1122	12083	-3.518	0.007	0.736	0.005
1123	12182	-3.465	0.007	0.750	0.005
1124	11885	-4.000	0.007	0.753	0.005
1125	12285	-3.050	0.007	0.792	0.005
1126	12175	-3.397	0.007	0.787	0.006
1127	11885	-3.260	0.008	0.801	0.006
1128	12403	-2.482	0.008	0.878	0.006
1129	12033	-3.933	0.008	0.811	0.006
1130	12267	-3.132	0.007	0.796	0.006
1131	11920	-2.961	0.007	0.771	0.005
1132	12006	-3.165	0.007	0.803	0.006
1133	7775	-4.983	0.009	0.700	0.006
1134	9962	-3.564	0.008	0.740	0.005
1135	12153	-3.244	0.007	0.794	0.005
1136	2152	-3.697	0.017	0.805	0.013
1137	24026	-3.434	0.005	0.813	0.004
1138	12163	-3.918	0.008	0.791	0.005
1139	12322	-3.527	0.007	0.763	0.005
1140	12578	-3.174	0.007	0.751	0.005
1141	12405	-3.266	0.007	0.758	0.005
1142	12668	-3.173	0.007	0.756	0.005
1143	11977	-3.036	0.007	0.748	0.006
1144	12411	-3.237	0.007	0.768	0.005
1145	12241	-3.126	0.007	0.762	0.005
1146	12541	-3.001	0.007	0.772	0.005
1147	12348	-2.853	0.007	0.760	0.005
1148	12209	-2.988	0.007	0.779	0.006
1149	11948	-3.758	0.008	0.780	0.005
1150	12337	-2.647	0.007	0.772	0.005
1151	12730	-2.953	0.007	0.753	0.005

1152	12347	-2.735	0.007	0.771	0.005
1153	12306	-2.954	0.007	0.741	0.005
1154	12494	-3.367	0.007	0.761	0.005
1155	12559	-3.089	0.007	0.764	0.005
1156	12381	-3.679	0.007	0.729	0.005
1157	12184	-4.045	0.007	0.742	0.005
1158	12278	-5.219	0.008	0.773	0.005
1159	12245	-2.828	0.008	0.878	0.006
1160	12455	-3.389	0.007	0.780	0.005
1161	12279	-3.299	0.007	0.772	0.005
1162	12450	-3.889	0.007	0.797	0.005
1163	12393	-2.767	0.007	0.812	0.006
1164	12167	-3.798	0.007	0.771	0.005
1165	12554	-3.287	0.007	0.772	0.005
1166	12308	-2.900	0.007	0.777	0.006
1167	12178	-3.843	0.007	0.749	0.005
1168	12174	-3.089	0.007	0.796	0.005
1169	12195	-2.234	0.008	0.841	0.006
1170	14727	-2.579	0.007	0.847	0.005
1171	23546	-3.583	0.005	0.789	0.004
1172	12494	-3.508	0.007	0.773	0.005
1173	12077	-3.115	0.007	0.767	0.005
1174	12549	-3.102	0.007	0.750	0.005
1175	12218	-4.118	0.007	0.775	0.005
1176	12173	-4.977	0.008	0.780	0.005
1177	12032	-3.137	0.007	0.812	0.006
1178	11811	-3.203	0.007	0.779	0.005
1179	12058	-2.903	0.007	0.795	0.005
1180	12213	-3.116	0.007	0.789	0.005
1181	12268	-3.660	0.007	0.772	0.005
1182	12285	-3.245	0.007	0.778	0.005
1183	12323	-3.628	0.007	0.761	0.005
1184	11956	-3.783	0.007	0.783	0.005
1185	12403	-2.987	0.007	0.805	0.006
1186	12213	-3.462	0.007	0.775	0.005
1187	12523	-3.751	0.007	0.760	0.005
1188	12240	-3.278	0.007	0.752	0.005
1189	12322	-3.465	0.007	0.748	0.005
1190	12101	-3.794	0.007	0.737	0.005
1191	12153	-3.484	0.007	0.735	0.005

1192	12273	-3.667	0.007	0.756	0.005
1193	12365	-2.710	0.007	0.791	0.005
1194	12090	-3.517	0.007	0.779	0.005
1195	12748	-3.060	0.007	0.746	0.005
1196	12478	-2.843	0.007	0.761	0.005
1197	12387	-3.013	0.007	0.756	0.005
1198	12167	-3.426	0.007	0.775	0.005
1199	12390	-2.803	0.007	0.783	0.005
1200	12308	-2.672	0.007	0.776	0.005
1201	12948	-2.954	0.007	0.773	0.005
1202	12329	-3.232	0.007	0.788	0.006
1203	12535	-2.728	0.007	0.776	0.005
1204	31838	-2.714	0.005	0.849	0.004
1205	39979	-4.303	0.004	0.770	0.003
1206	12218	-3.906	0.007	0.765	0.005
1207	12309	-3.461	0.007	0.757	0.005
1208	12281	-3.193	0.007	0.748	0.005
1209	12506	-3.504	0.007	0.794	0.006
1210	12358	-4.873	0.007	0.785	0.005
1211	12591	-5.751	0.007	0.790	0.005
1212	12480	-5.172	0.008	0.796	0.006
1213	12104	-4.899	0.008	0.800	0.005
1214	12373	-5.761	0.007	0.759	0.005
1215	12412	-5.944	0.008	0.792	0.006
1216	12914	-5.341	0.007	0.797	0.005
1217	12991	-5.431	0.008	0.812	0.006
1218	12889	-5.455	0.007	0.818	0.006
1219	12782	-5.987	0.008	0.827	0.006
1220	12246	-5.963	0.008	0.798	0.006
1221	12847	-5.353	0.008	0.817	0.005
1222	12604	-3.994	0.007	0.806	0.005
1223	12457	-3.859	0.008	0.768	0.005
1224	12251	-4.059	0.007	0.770	0.005
1225	12689	-5.295	0.007	0.776	0.005
1226	12468	-4.612	0.007	0.772	0.005
1227	12546	-4.429	0.007	0.744	0.005
1228	12589	-3.777	0.007	0.792	0.006
1229	12656	-4.590	0.007	0.779	0.005
1230	12782	-3.659	0.007	0.781	0.005
1231	7998	-3.897	0.009	0.772	0.007

1232	17620	-3.856	0.006	0.782	0.005
1233	12265	-2.842	0.007	0.764	0.005
1234	12702	-1.583	0.007	0.790	0.005
1235	12570	-1.522	0.007	0.781	0.005
1236	12601	-2.189	0.007	0.779	0.005
1237	12598	-1.647	0.007	0.782	0.005
1238	39559	-2.571	0.004	0.799	0.003
1239	85518	-3.510	0.003	0.808	0.002
1240	12957	-2.395	0.008	0.881	0.006
1241	12429	-2.766	0.008	0.853	0.006
1242	12688	-3.131	0.008	0.805	0.006
1243	12302	-2.608	0.008	0.871	0.006
1244	12305	-4.101	0.008	0.893	0.006
1245	12357	-5.962	0.008	0.793	0.005
1246	12179	-4.841	0.008	0.871	0.006
1247	15432	-5.116	0.007	0.837	0.005
1248	7964	-6.540	0.009	0.746	0.007
1249	12381	-6.182	0.007	0.759	0.005
1250	12548	-5.918	0.008	0.798	0.006
1251	12530	-6.869	0.007	0.777	0.005
1252	12787	-5.894	0.008	0.887	0.006
1253	12761	-6.773	0.007	0.782	0.005
1254	13018	-6.570	0.007	0.736	0.005
1255	12816	-6.306	0.008	0.805	0.005
1256	12767	-4.473	0.008	0.834	0.006
1257	12760	-3.876	0.007	0.777	0.005
1258	12839	-4.709	0.007	0.766	0.005
1259	12651	-4.820	0.007	0.750	0.005
1260	12679	-4.693	0.007	0.764	0.005
1261	12722	-3.477	0.007	0.804	0.006
1262	12669	-3.209	0.007	0.786	0.005
1263	12600	-3.775	0.007	0.788	0.006
1264	13254	-3.720	0.007	0.768	0.005
1265	12404	-3.712	0.008	0.800	0.006
1266	12758	-2.588	0.007	0.815	0.005
1267	12347	-2.681	0.007	0.752	0.005
1268	12291	-2.438	0.007	0.768	0.005
1269	12438	-1.651	0.007	0.764	0.005
1270	12430	-2.305	0.007	0.760	0.005
1271	12709	-2.361	0.007	0.783	0.005

1272	26640	-1.962	0.005	0.799	0.004
1273	23758	-4.100	0.005	0.799	0.004
1274	12671	-3.579	0.007	0.795	0.005
1275	12228	-3.620	0.007	0.752	0.005
1276	12197	-3.337	0.007	0.773	0.005
1277	12215	-3.068	0.008	0.816	0.005
1278	9994	-3.761	0.009	0.819	0.006
1279	20797	-4.862	0.006	0.853	0.004
1280	12635	-4.592	0.008	0.855	0.006
1281	12441	-5.528	0.008	0.813	0.006
1282	11403	-6.432	0.007	0.751	0.006
1283	7222	-7.308	0.009	0.737	0.007
1284	12296	-6.496	0.007	0.752	0.006
1285	12664	-6.605	0.007	0.752	0.005
1286	12715	-5.959	0.008	0.821	0.006
1287	12378	-6.677	0.007	0.750	0.005
1288	12215	-6.557	0.007	0.774	0.005
1289	12687	-6.626	0.008	0.832	0.006
1290	12775	-3.882	0.008	0.867	0.006
1291	12701	-3.958	0.008	0.863	0.006
1292	12965	-3.488	0.008	0.817	0.006
1293	12837	-3.711	0.007	0.819	0.006
1294	13222	-4.750	0.007	0.798	0.005
1295	12997	-4.174	0.007	0.811	0.006
1296	12710	-3.626	0.007	0.766	0.005
1297	12849	-3.576	0.008	0.825	0.006
1298	12709	-3.309	0.008	0.830	0.006
1299	12733	-2.965	0.008	0.866	0.006
1300	12512	-2.876	0.008	0.803	0.006
1301	12659	-2.589	0.007	0.769	0.005
1302	12333	-2.424	0.007	0.730	0.005
1303	12457	-1.156	0.007	0.781	0.005
1304	12655	-1.713	0.007	0.774	0.005
1305	12834	-2.607	0.007	0.791	0.005
1306	60093	-2.178	0.003	0.784	0.002
1307	38606	-3.766	0.004	0.752	0.003
1308	12598	-3.469	0.007	0.790	0.005
1309	12381	-3.344	0.007	0.729	0.005
1310	12496	-3.287	0.007	0.738	0.005
1311	12643	-3.735	0.007	0.775	0.005

1312	12582	-4.587	0.008	0.792	0.006
1313	12492	-5.183	0.008	0.822	0.006
1314	12119	-5.544	0.008	0.832	0.006
1315	12382	-6.032	0.008	0.786	0.005
1316	12326	-6.560	0.008	0.762	0.006
1317	12347	-6.116	0.007	0.774	0.005
1318	12112	-4.958	0.008	0.795	0.005
1319	12408	-5.316	0.008	0.795	0.006
1320	12515	-5.766	0.008	0.818	0.006
1321	12476	-6.763	0.007	0.775	0.006
1322	12469	-6.799	0.007	0.782	0.005
1323	13122	-5.033	0.008	0.876	0.006
1324	13002	-3.806	0.008	0.840	0.005
1325	12943	-3.728	0.007	0.762	0.005
1326	12514	-3.964	0.007	0.741	0.005
1327	12782	-4.209	0.007	0.748	0.005
1328	13012	-3.349	0.007	0.828	0.006
1329	12617	-3.552	0.007	0.804	0.005
1330	12518	-3.898	0.007	0.782	0.006
1331	12813	-3.742	0.007	0.757	0.005
1332	12774	-3.287	0.007	0.801	0.005
1333	10645	-4.643	0.008	0.744	0.006
1334	25959	-3.375	0.005	0.770	0.004
1335	203	-2.077	0.021	0.857	0.018
1336	23	-1.218	0.205	0.984	0.145
1337	16	-1.499	0.242	0.967	0.171
1338	14	-1.300	0.340	1.274	0.241
1339	16	-1.742	0.253	1.012	0.179
1340	19	-1.199	0.258	1.123	0.182
1341	27241	-3.470	0.005	0.828	0.004
1342	12383	-3.651	0.007	0.776	0.006
1343	12272	-3.144	0.007	0.760	0.005
1344	12650	-3.915	0.007	0.717	0.005
1345	12424	-3.889	0.007	0.763	0.005
1346	12461	-4.255	0.007	0.787	0.005
1347	12338	-4.631	0.008	0.837	0.006
1348	12300	-4.742	0.008	0.811	0.006
1349	12428	-5.083	0.008	0.838	0.006
1350	12378	-6.038	0.007	0.751	0.005
1351	12724	-5.894	0.007	0.741	0.005

1352	12806	-5.297	0.008	0.805	0.006
1353	12651	-5.436	0.008	0.868	0.006
1354	12917	-7.114	0.007	0.741	0.005
1355	12663	-6.636	0.007	0.751	0.005
1356	12908	-6.388	0.007	0.744	0.005
1357	12685	-6.051	0.008	0.766	0.005
1358	12591	-4.011	0.007	0.815	0.005
1359	12290	-4.904	0.007	0.747	0.005
1360	12954	-4.981	0.007	0.710	0.005
1361	12474	-5.635	0.007	0.733	0.005
1362	12591	-5.209	0.007	0.742	0.005
1363	12933	-4.095	0.007	0.773	0.005
1364	12658	-4.456	0.007	0.740	0.005
1365	12479	-4.483	0.007	0.769	0.005
1366	12806	-4.679	0.008	0.798	0.005
1367	12675	-5.207	0.008	0.830	0.006
1368	92420	-2.432	0.003	0.855	0.002
1369	13522	-1.586	0.007	0.811	0.006
1370	12822	-0.911	0.008	0.834	0.006
1371	12937	-1.986	0.007	0.769	0.005
1372	12584	-1.972	0.007	0.731	0.005
1373	12707	-1.583	0.007	0.811	0.005
1374	13345	-3.060	0.007	0.742	0.005
1375	38790	-4.178	0.004	0.786	0.003
1376	12231	-3.147	0.008	0.814	0.006
1377	12397	-3.068	0.007	0.764	0.005
1378	12491	-3.068	0.007	0.787	0.005
1379	13088	-3.728	0.007	0.774	0.005
1380	12930	-4.609	0.007	0.751	0.005
1381	12243	-4.784	0.007	0.778	0.005
1382	12264	-5.088	0.008	0.832	0.006
1383	12320	-6.433	0.007	0.729	0.005
1384	12344	-6.033	0.007	0.764	0.005
1385	12398	-6.169	0.007	0.727	0.005
1386	12343	-6.817	0.007	0.728	0.005
1387	12354	-7.118	0.007	0.731	0.005
1388	12173	-6.507	0.007	0.732	0.005
1389	12556	-7.044	0.007	0.760	0.005
1390	12661	-6.883	0.007	0.759	0.005
1391	12497	-7.149	0.007	0.750	0.005

1392	12545	-5.524	0.007	0.792	0.005
1393	12552	-4.033	0.007	0.820	0.006
1394	12544	-3.388	0.008	0.836	0.006
1395	12829	-4.473	0.007	0.756	0.005
1396	12477	-4.784	0.008	0.840	0.006
1397	12581	-3.400	0.008	0.845	0.006
1398	12293	-3.227	0.008	0.894	0.006
1399	30327	-5.572	0.005	0.725	0.003
1400	74161	-3.994	0.003	0.803	0.002
1401	7531	-3.578	0.010	0.818	0.007
1402	33545	-3.090	0.004	0.782	0.003
1403	11234	-2.350	0.007	0.774	0.006
1404	12993	-1.891	0.007	0.754	0.005
1405	12671	-1.799	0.007	0.774	0.005
1406	12691	-1.072	0.007	0.801	0.005
1407	12641	-1.924	0.008	0.824	0.006
1408	66796	-2.498	0.003	0.770	0.002
1409	26295	-3.144	0.006	0.874	0.004
1410	12424	-4.880	0.007	0.739	0.005
1411	12317	-3.798	0.007	0.727	0.005
1412	12468	-3.577	0.007	0.770	0.005
1413	12272	-3.649	0.007	0.757	0.005
1414	12361	-4.325	0.007	0.787	0.005
1415	12582	-5.757	0.007	0.789	0.006
1416	12707	-5.946	0.008	0.871	0.006
1417	12332	-7.861	0.033	0.722	0.023
1418	12569	-5.720	0.008	0.876	0.006
1419	12611	-6.353	0.007	0.739	0.005
1420	12503	-6.353	0.007	0.750	0.006
1421	12413	-5.383	0.008	0.843	0.006
1422	12599	-6.115	0.007	0.747	0.005
1423	12705	-4.754	0.008	0.924	0.006
1424	12373	-6.601	0.007	0.758	0.005
1425	12419	-5.166	0.008	0.824	0.005
1426	12608	-4.193	0.007	0.813	0.005
1427	12827	-5.016	0.007	0.768	0.005
1428	12596	-3.296	0.008	0.894	0.006
1429	12796	-5.083	0.007	0.773	0.005
1430	13184	-4.244	0.007	0.820	0.005
1431	13175	-6.298	0.007	0.781	0.005

1432	12771	-6.230	0.007	0.728	0.005
1433	12867	-6.159	0.007	0.732	0.005
1434	12624	-5.832	0.007	0.775	0.005
1435	13025	-5.784	0.007	0.771	0.005
1436	12781	-5.394	0.008	0.815	0.006
1437	12503	-2.200	0.007	0.854	0.006
1438	12483	-1.829	0.007	0.746	0.005
1439	12569	-2.028	0.007	0.740	0.005
1440	12734	-1.229	0.007	0.799	0.005
1441	12618	-1.590	0.007	0.810	0.005
1442	37491	-2.075	0.004	0.810	0.003
1443	38592	-3.280	0.004	0.797	0.003
1444	12546	-3.611	0.007	0.777	0.006
1445	12272	-2.769	0.007	0.813	0.006
1446	12248	-3.676	0.007	0.775	0.005
1447	12354	-3.960	0.007	0.746	0.005
1448	12237	-4.397	0.007	0.785	0.006
1449	12606	-5.738	0.008	0.796	0.005
1450	12647	-5.685	0.008	0.792	0.005
1451	12526	-5.413	0.008	0.872	0.006
1452	22941	-6.842	0.005	0.754	0.004
1453	36945	-6.140	0.004	0.776	0.003
1454	37552	-5.179	0.005	0.916	0.004
1455	117487	-6.654	0.002	0.724	0.002
1456	39786	-7.098	0.004	0.716	0.003
1457	45444	-6.118	0.004	0.750	0.003
1458	12812	-6.266	0.007	0.741	0.005
1459	12409	-6.118	0.007	0.774	0.005
1460	12399	-6.289	0.007	0.777	0.005
1461	12404	-4.805	0.007	0.750	0.005
1462	12311	-5.146	0.007	0.753	0.005
1463	12418	-4.972	0.007	0.703	0.005
1464	12407	-4.812	0.007	0.761	0.005
1465	12617	-5.604	0.008	0.806	0.005
1466	12517	-5.950	0.007	0.758	0.005
1467	12219	-6.824	0.007	0.725	0.005
1468	12333	-7.250	0.007	0.739	0.005
1469	12440	-7.423	0.007	0.746	0.005
1470	12245	-4.684	0.009	1.001	0.006
1471	12543	-2.385	0.007	0.831	0.006

1472	12149	-1.389	0.007	0.776	0.005
1473	12567	-2.033	0.007	0.745	0.005
1474	12953	-1.407	0.007	0.810	0.005
1475	12734	-2.790	0.007	0.718	0.005
1476	39642	-2.369	0.004	0.783	0.003
1477	26811	-4.655	0.005	0.718	0.003
1478	12066	-3.909	0.007	0.738	0.005
1479	12200	-3.040	0.008	0.823	0.006
1480	12475	-4.061	0.008	0.799	0.005
1481	12062	-3.955	0.007	0.765	0.005
1482	12766	-5.084	0.007	0.713	0.005
1483	12498	-4.889	0.008	0.857	0.006
1484	12336	-5.432	0.008	0.801	0.005
1485	12658	-5.561	0.008	0.853	0.006
1486	12342	-7.272	0.007	0.736	0.005
1487	12111	-6.794	0.007	0.767	0.005
1488	12029	-7.538	0.002	0.720	0.001
1489	11989	-7.127	0.007	0.721	0.005
1490	12320	-7.028	0.007	0.729	0.005
1491	12305	-6.359	0.007	0.743	0.005
1492	12275	-5.291	0.008	0.813	0.006
1493	12432	-5.663	0.007	0.770	0.005
1494	12489	-3.378	0.008	0.948	0.006
1495	12290	-4.932	0.008	0.771	0.005
1496	12207	-4.693	0.007	0.749	0.005
1497	12415	-5.607	0.007	0.746	0.005
1498	12334	-4.418	0.008	0.874	0.006
1499	12508	-7.173	0.007	0.737	0.005
1500	12325	-5.747	0.007	0.787	0.005
1501	12543	-5.542	0.007	0.757	0.005
1502	12245	-5.597	0.007	0.778	0.005
1503	11975	-6.724	0.008	0.798	0.006
1504	12320	-5.959	0.008	0.811	0.006
1505	12396	-2.362	0.008	0.908	0.006
1506	12304	-1.649	0.007	0.798	0.005
1507	12263	-2.403	0.007	0.760	0.005
1508	12478	-2.210	0.007	0.725	0.005
1509	12566	-1.672	0.007	0.781	0.005
1510	58937	-2.397	0.003	0.764	0.002
1511	37840	-3.178	0.004	0.850	0.003

1512	12614	-4.450	0.007	0.750	0.005
1513	12123	-4.117	0.007	0.752	0.005
1514	12362	-4.076	0.007	0.759	0.005
1515	12270	-3.803	0.007	0.727	0.005
1516	12101	-4.634	0.007	0.796	0.006
1517	12371	-6.042	0.007	0.778	0.005
1518	12438	-5.975	0.007	0.757	0.005
1519	12359	-6.534	0.007	0.739	0.005
1520	11415	-6.768	0.008	0.925	0.007
1521	161	-8.531	0.025	0.900	0.004
1522	11852	-6.389	0.009	0.972	0.007
1523	12221	-7.259	0.007	0.732	0.005
1524	11929	-6.137	0.007	0.773	0.005
1525	617	-6.276	0.034	0.798	0.024
1526	1104	-5.347	0.023	0.785	0.019
1527	373	-5.906	0.014	0.800	0.001
1528	0	0.000	0.000	-1.000	0.000
1529	1008	-5.591	0.023	0.675	0.016
1530	9611	-4.482	0.009	0.798	0.006
1531	12730	-4.300	0.008	0.847	0.006
1532	11922	-5.612	0.007	0.782	0.005
1533	11766	-6.714	0.007	0.698	0.005
1534	12287	-6.783	0.007	0.728	0.005
1535	11982	-6.899	0.007	0.723	0.005
1536	11801	-6.795	0.007	0.756	0.006
1537	12142	-6.230	0.007	0.745	0.005
1538	12327	-5.345	0.008	0.858	0.006
1539	12324	-2.800	0.007	0.769	0.005
1540	12116	-2.955	0.007	0.745	0.005
1541	12432	-2.817	0.007	0.731	0.005
1542	12287	-2.004	0.008	0.798	0.005
1543	12096	-1.556	0.007	0.801	0.005
1544	23373	-1.402	0.006	0.830	0.004
1545	66460	-3.518	0.003	0.807	0.002
1546	25213	-3.874	0.005	0.766	0.004
1547	24439	-4.203	0.005	0.770	0.004
1548	24420	-4.622	0.005	0.773	0.004
1549	24333	-3.888	0.005	0.791	0.004
1550	23918	-4.606	0.005	0.838	0.004
1551	23206	-6.569	0.015	0.762	0.010

1552	23342	-6.176	0.005	0.757	0.004
1553	22912	-4.642	0.006	0.953	0.005
1554	23916	-6.914	0.005	0.758	0.004
1555	23984	-7.086	0.005	0.757	0.004
1556	23653	-6.116	0.005	0.771	0.004
1557	22110	-5.112	0.006	0.808	0.004
1558	17835	-5.657	0.006	0.829	0.005
1559	18006	-6.090	0.006	0.710	0.004
1560	1218	-6.325	0.024	0.814	0.019
1561	0	0.000	0.000	-1.000	0.000
1562	0	0.000	0.000	-1.000	0.000
1563	1593	-6.592	0.023	0.777	0.017
1564	13363	-5.315	0.007	0.803	0.005
1565	18365	-3.772	0.007	0.885	0.005
1566	18424	-5.517	0.006	0.755	0.004
1567	17777	-6.584	0.006	0.738	0.004
1568	17456	-5.966	0.006	0.774	0.004
1569	18301	-6.784	0.006	0.772	0.004
1570	18332	-7.566	0.006	0.712	0.004
1571	18326	-5.603	0.008	0.988	0.005
1572	18327	-5.748	0.007	0.828	0.005
1573	17719	-2.889	0.006	0.849	0.005
1574	18286	-2.156	0.006	0.725	0.004
1575	18043	-2.847	0.006	0.736	0.004
1576	18355	-1.445	0.006	0.837	0.005
1577	18593	-3.192	0.006	0.788	0.004
1578	47172	-1.719	0.004	0.851	0.003
1579	19693	-3.941	0.006	0.843	0.005
1580	3120	-3.640	0.014	0.752	0.010
1581	3557	-3.687	0.014	0.820	0.011
1582	2595	-5.017	0.015	0.737	0.011
1583	3403	-3.996	0.014	0.770	0.010
1584	2866	-5.133	0.015	0.741	0.011
1585	29515	-5.104	0.005	0.719	0.003
1586	2552	-5.015	0.015	0.705	0.012
1587	2722	-3.922	0.016	0.791	0.012
1588	3255	-4.169	0.014	0.779	0.010
1589	3029	-4.118	0.014	0.739	0.011
1590	1213	-4.076	0.023	0.819	0.017
1591	2660	-6.188	0.016	0.697	0.011

1592	1938	-6.348	0.018	0.752	0.015
1593	2451	-6.574	0.015	0.663	0.011
1594	296	-6.439	0.016	0.781	0.012
1595	0	0.000	0.000	-1.000	0.000
1596	0	0.000	0.000	-1.000	0.000
1597	931	-7.051	0.025	0.717	0.019
1598	1591	-7.078	0.021	0.783	0.016
1599	1377	-5.538	0.025	0.889	0.018
1600	1722	-7.135	0.020	0.715	0.013
1601	2576	-5.906	0.016	0.719	0.011
1602	1839	-6.688	0.017	0.725	0.013
1603	1810	-6.545	0.019	0.747	0.015
1604	2210	-6.927	0.017	0.746	0.013
1605	2284	-7.248	0.016	0.737	0.013
1606	2609	-5.881	0.017	0.791	0.012
1607	1861	-1.387	0.022	0.964	0.019
1608	2493	-2.102	0.016	0.759	0.012
1609	2577	-2.421	0.014	0.714	0.011
1610	2045	-1.904	0.017	0.742	0.014
1611	1936	-1.473	0.018	0.742	0.014
1612	3314	-1.376	0.014	0.810	0.010
1613	2534	-4.883	0.017	0.789	0.011
1614	3298	-4.367	0.013	0.744	0.009
1615	1255	-3.126	0.026	0.826	0.019
1616	3273	-3.768	0.014	0.777	0.010
1617	3062	-3.970	0.014	0.709	0.010
1618	2184	-4.297	0.017	0.733	0.014
1619	2589	-4.497	0.014	0.690	0.012
1620	3744	-3.982	0.013	0.762	0.009
1621	3096	-3.942	0.015	0.788	0.011
1622	3463	-5.590	0.014	0.717	0.009
1623	3115	-5.372	0.014	0.681	0.010
1624	2542	-4.969	0.015	0.771	0.012
1625	3355	-7.084	0.014	0.726	0.010
1626	2369	-6.222	0.017	0.708	0.012
1627	3187	-6.845	0.013	0.686	0.010
1628	1022	-7.267	0.022	0.657	0.016
1629	955	-5.737	0.026	0.771	0.021
1630	712	-7.176	0.028	0.645	0.023
1631	1050	-9.245	0.023	0.604	0.018

1632	2075	-7.417	0.016	0.675	0.011
1633	618	-7.168	0.032	0.764	0.022
1634	4242	-6.300	0.011	0.706	0.009
1635	4065	-5.544	0.012	0.741	0.009
1636	2671	-6.262	0.016	0.649	0.010
1637	2807	-3.119	0.028	1.281	0.022
1638	3982	-4.643	0.015	0.905	0.011
1639	3040	-6.369	0.016	0.771	0.011
1640	3700	-5.781	0.014	0.802	0.011
1641	3168	-1.843	0.015	0.873	0.013
1642	4068	-2.307	0.012	0.745	0.009
1643	3687	-1.228	0.013	0.771	0.009
1644	3133	-1.542	0.013	0.708	0.010
1645	3661	-1.209	0.013	0.736	0.009
1646	4354	-2.356	0.012	0.738	0.008
1647	3171	-5.011	0.015	0.772	0.011
1648	2873	-3.656	0.015	0.804	0.011
1649	2651	-4.708	0.016	0.747	0.012
1650	2900	-4.306	0.014	0.732	0.012
1651	3430	-4.459	0.013	0.744	0.010
1652	4347	-4.613	0.012	0.747	0.009
1653	3155	-3.908	0.014	0.753	0.010
1654	3099	-3.158	0.016	0.838	0.012
1655	3060	-4.123	0.015	0.718	0.011
1656	2496	-4.542	0.015	0.726	0.012
1657	3143	-3.977	0.014	0.718	0.010
1658	3239	-4.611	0.014	0.804	0.011
1659	3402	-7.192	0.015	0.763	0.010
1660	2845	-6.780	0.014	0.703	0.010
1661	3013	-7.544	0.013	0.686	0.010
1662	1297	-7.483	0.022	0.728	0.018
1663	2238	-7.370	0.016	0.689	0.012
1664	2085	-7.628	0.016	0.701	0.012
1665	2649	-7.370	0.015	0.720	0.011
1666	3313	-8.395	0.013	0.690	0.010
1667	2230	-6.995	0.016	0.746	0.012
1668	2465	-6.867	0.015	0.718	0.010
1669	2122	-6.462	0.016	0.700	0.012
1670	2649	-5.599	0.016	0.719	0.012
1671	2360	-5.037	0.018	0.779	0.013

1672	3416	-5.126	0.014	0.792	0.011
1673	3157	-6.406	0.013	0.704	0.009
1674	3352	-4.860	0.017	0.920	0.012
1675	2698	-2.241	0.015	0.785	0.012
1676	3099	-2.015	0.014	0.744	0.010
1677	3659	-2.122	0.012	0.703	0.009
1678	3622	-1.532	0.013	0.752	0.010
1679	3263	-1.539	0.013	0.734	0.010
1680	3260	-1.334	0.015	0.837	0.011
1681	1982	-5.733	0.018	0.728	0.014
1682	2201	-4.591	0.017	0.777	0.013
1683	2102	-4.212	0.017	0.739	0.013
1684	2604	-4.506	0.015	0.737	0.011
1685	23545	-3.502	0.005	0.785	0.004
1686	3810	-4.657	0.013	0.756	0.009
1687	3597	-3.987	0.014	0.792	0.010
1688	2883	-4.025	0.015	0.708	0.011
1689	2976	-3.064	0.016	0.852	0.013
1690	294	0.786	0.102	1.563	0.090
1691	4062	-3.516	0.013	0.799	0.009
1692	4244	-4.935	0.012	0.816	0.010
1693	3851	-7.442	0.013	0.728	0.009
1694	4155	-6.911	0.012	0.739	0.009
1695	3026	-6.936	0.014	0.751	0.010
1696	3860	-8.129	0.012	0.712	0.009
1697	3057	-9.029	0.013	0.633	0.009
1698	3420	-8.136	0.013	0.694	0.009
1699	3125	-7.638	0.004	0.707	0.003
1700	2938	-7.041	0.014	0.713	0.011
1701	3267	-7.870	0.013	0.687	0.009
1702	3688	-7.013	0.013	0.692	0.008
1703	1101	-6.798	0.024	0.732	0.019
1704	3515	-4.566	0.016	0.925	0.012
1705	3393	-5.889	0.014	0.756	0.010
1706	3066	-5.718	0.015	0.733	0.011
1707	3027	-5.048	0.015	0.789	0.012
1708	2920	-6.516	0.018	0.792	0.012
1709	2906	-3.396	0.015	0.843	0.012
1710	3028	-2.645	0.014	0.733	0.010
1711	3026	-1.655	0.014	0.740	0.010

1712	3710	-2.085	0.012	0.667	0.009
1713	2831	-1.970	0.014	0.727	0.010
1714	3413	-2.485	0.014	0.766	0.010
1715	1181	-3.796	0.024	0.835	0.018
1716	9127	-4.447	0.008	0.717	0.006
1717	2147	-3.885	0.019	0.810	0.013
1718	5621	-4.918	0.011	0.754	0.008
1719	2707	-5.094	0.016	0.730	0.012
1720	4811	-3.938	0.012	0.771	0.008
1721	4139	-3.890	0.012	0.744	0.009
1722	3877	-4.563	0.012	0.697	0.008
1723	3706	-4.533	0.012	0.682	0.009
1724	3910	-4.568	0.012	0.718	0.009
1725	3553	-5.230	0.013	0.688	0.009
1726	4198	-4.762	0.013	0.869	0.011
1727	3546	-8.733	0.014	0.756	0.010
1728	3565	-8.117	0.012	0.674	0.010
1729	3659	-8.170	0.012	0.664	0.008
1730	4434	-7.199	0.011	0.666	0.008
1731	2976	-8.124	0.013	0.669	0.009
1732	3442	-7.540	0.013	0.657	0.009
1733	4004	-7.494	0.012	0.689	0.009
1734	3938	-6.847	0.013	0.748	0.010
1735	3674	-6.800	0.013	0.734	0.009
1736	3836	-7.704	0.012	0.678	0.009
1737	3802	-7.800	0.013	0.752	0.009
1738	3227	-5.169	0.016	0.885	0.011
1739	3863	-5.719	0.012	0.687	0.009
1740	3511	-6.378	0.013	0.724	0.010
1741	3027	-6.626	0.014	0.717	0.011
1742	3223	-6.320	0.016	0.778	0.012
1743	3477	-3.370	0.015	0.915	0.012
1744	3054	-2.331	0.014	0.740	0.010
1745	3738	-2.584	0.012	0.712	0.009
1746	3394	-2.002	0.014	0.750	0.010
1747	3564	-2.685	0.014	0.795	0.010
1748	3444	-1.477	0.015	0.874	0.011
1749	2438	-1.942	0.016	0.750	0.011
1750	2762	-2.195	0.014	0.716	0.010
1751	3536	-2.252	0.013	0.744	0.010

1752	2600	-2.727	0.015	0.727	0.012
1753	2783	-2.250	0.015	0.724	0.012
1754	3615	-2.131	0.013	0.758	0.010
1755	2542	-3.978	0.017	0.760	0.012
1756	1940	-4.714	0.017	0.706	0.013
1757	2915	-3.961	0.015	0.761	0.011
1758	3833	-4.638	0.012	0.706	0.008
1759	2311	-3.789	0.018	0.743	0.012
1760	2866	-4.624	0.015	0.762	0.010
1761	4125	-5.966	0.014	0.930	0.010
1762	2779	-8.600	0.015	0.720	0.010
1763	3447	-7.572	0.013	0.681	0.009
1764	2224	-7.269	0.016	0.695	0.013
1765	2674	-5.720	0.018	0.813	0.013
1766	4337	-7.668	0.011	0.706	0.009
1767	2761	-7.036	0.015	0.723	0.011
1768	2328	-6.215	0.016	0.698	0.012
1769	3043	-7.097	0.014	0.729	0.010
1770	2722	-6.208	0.015	0.724	0.011
1771	3050	-6.792	0.014	0.683	0.010
1772	3443	-5.765	0.014	0.758	0.010
1773	4389	-4.349	0.013	0.876	0.010
1774	3443	-6.878	0.014	0.721	0.011
1775	3158	-7.247	0.013	0.673	0.009
1776	3503	-5.605	0.014	0.806	0.011
1777	4323	-5.469	0.012	0.672	0.008
1778	3023	-4.142	0.014	0.735	0.010
1779	2247	-3.807	0.017	0.768	0.012
1780	3412	-4.315	0.012	0.659	0.009
1781	3198	-4.066	0.014	0.743	0.010
1782	3801	-3.331	0.014	0.844	0.011
1783	4947	-2.063	0.012	0.764	0.008
1784	3968	-2.835	0.012	0.697	0.008
1785	3076	-1.440	0.015	0.810	0.011
1786	3086	-3.001	0.014	0.729	0.010
1787	4182	-1.428	0.003	0.785	0.003
1788	3131	-2.051	0.015	0.860	0.011
1789	2819	-4.601	0.017	0.788	0.012
1790	3775	-4.432	0.012	0.722	0.009
1791	3009	-3.868	0.014	0.764	0.010

1792	3381	-4.972	0.014	0.689	0.009
1793	3427	-4.797	0.013	0.693	0.010
1794	4490	-4.722	0.012	0.769	0.009
1795	3558	-6.667	0.015	0.905	0.011
1796	1150	-9.080	0.018	0.609	0.013
1797	3335	-8.372	0.012	0.675	0.009
1798	3165	-6.895	0.014	0.760	0.011
1799	3293	-7.767	0.013	0.722	0.009
1800	3314	-6.099	0.014	0.799	0.011
1801	3400	-5.841	0.014	0.757	0.011
1802	4426	-7.475	0.012	0.740	0.009
1803	4314	-6.167	0.012	0.699	0.009
1804	4077	-6.640	0.013	0.755	0.010
1805	3077	-5.368	0.015	0.783	0.011
1806	3309	-5.831	0.013	0.747	0.010
1807	2927	-5.174	0.016	0.759	0.011
1808	3486	-5.991	0.014	0.754	0.010
1809	3171	-6.750	0.014	0.744	0.010
1810	2824	-6.244	0.014	0.717	0.011
1811	3176	-5.327	0.014	0.678	0.011
1812	3672	-4.362	0.014	0.734	0.010
1813	2903	-5.348	0.014	0.651	0.010
1814	4056	-3.660	0.012	0.778	0.009
1815	3502	-3.656	0.013	0.731	0.010
1816	4887	-3.905	0.011	0.761	0.008
1817	5144	-2.343	0.011	0.769	0.008
1818	3015	-2.277	0.014	0.706	0.010
1819	3488	-2.582	0.013	0.703	0.009
1820	3802	-2.405	0.012	0.737	0.009
1821	3565	-1.924	0.013	0.753	0.009
1822	2295	-2.899	0.016	0.770	0.013
1823	3284	-5.167	0.015	0.769	0.011
1824	3533	-5.182	0.013	0.739	0.010
1825	3917	-5.245	0.012	0.711	0.009
1826	2873	-4.280	0.014	0.724	0.011
1827	3274	-4.733	0.013	0.709	0.010
1828	3432	-5.811	0.013	0.681	0.010
1829	4323	-6.580	0.011	0.683	0.009
1830	3480	-7.175	0.012	0.650	0.009
1831	3605	-7.385	0.016	0.860	0.013

1832	1321	-10.702	0.013	0.599	0.001
1833	3311	-6.402	0.024	1.101	0.019
1834	3760	-6.486	0.012	0.684	0.009
1835	3468	-7.241	0.013	0.716	0.009
1836	3799	-6.933	0.012	0.650	0.009
1837	3253	-7.077	0.013	0.664	0.010
1838	3268	-6.956	0.012	0.680	0.009
1839	2746	-5.839	0.015	0.755	0.011
1840	3597	-5.540	0.013	0.726	0.009
1841	2833	-6.354	0.014	0.709	0.011
1842	3340	-7.714	0.003	0.641	0.002
1843	2966	-7.555	0.015	0.706	0.010
1844	3258	-5.446	0.015	0.851	0.011
1845	3891	-5.329	0.013	0.666	0.009
1846	2786	-4.570	0.014	0.738	0.010
1847	2791	-4.486	0.015	0.708	0.011
1848	3291	-3.738	0.013	0.722	0.010
1849	3395	-3.679	0.013	0.723	0.009
1850	7139	-3.455	0.009	0.777	0.007
1851	4318	-2.602	0.011	0.712	0.009
1852	3621	-2.725	0.012	0.679	0.009
1853	3512	-2.064	0.013	0.750	0.010
1854	3039	-2.240	0.014	0.708	0.010
1855	3116	-1.581	0.015	0.729	0.011
1856	3488	-2.385	0.014	0.829	0.010
1857	3730	-5.643	0.014	0.738	0.010
1858	3603	-5.222	0.013	0.719	0.009
1859	3228	-5.282	0.013	0.675	0.010
1860	3396	-4.920	0.013	0.718	0.010
1861	3952	-4.253	0.014	0.776	0.009
1862	3788	-5.593	0.013	0.742	0.010
1863	3465	-6.921	0.012	0.707	0.009
1864	3933	-7.153	0.012	0.706	0.008
1865	3412	-8.616	0.012	0.668	0.008
1866	3882	-6.574	0.013	0.824	0.010
1867	3281	-6.569	0.013	0.702	0.010
1868	2910	-7.002	0.014	0.727	0.011
1869	2524	-6.214	0.017	0.792	0.012
1870	3527	-7.657	0.012	0.688	0.009
1871	2413	-7.272	0.015	0.694	0.011

1872	3295	-6.901	0.014	0.724	0.009
1873	3185	-6.018	0.014	0.700	0.010
1874	4186	-6.614	0.012	0.694	0.008
1875	2716	-5.947	0.015	0.749	0.010
1876	4239	-6.680	0.012	0.711	0.009
1877	3280	-7.222	0.013	0.695	0.010
1878	4044	-6.179	0.012	0.742	0.009
1879	3373	-5.690	0.013	0.675	0.010
1880	2647	-4.821	0.017	0.762	0.012
1881	2133	-3.481	0.017	0.799	0.012
1882	2968	-4.065	0.014	0.725	0.011
1883	3018	-3.582	0.014	0.757	0.011
1884	3996	-4.254	0.013	0.772	0.010
1885	3589	-2.936	0.013	0.745	0.010
1886	3706	-1.584	0.013	0.795	0.010
1887	3030	-2.640	0.015	0.803	0.012
1888	2326	-1.740	0.016	0.760	0.012
1889	3888	-2.078	0.011	0.694	0.009
1890	2680	-3.315	0.015	0.776	0.011
1891	3034	-5.234	0.015	0.780	0.011
1892	2554	-4.094	0.016	0.749	0.011
1893	3440	-4.149	0.013	0.767	0.011
1894	2771	-4.793	0.015	0.729	0.011
1895	2468	-4.711	0.016	0.751	0.012
1896	2835	-5.322	0.015	0.778	0.012
1897	2278	-6.939	0.017	0.746	0.013
1898	2377	-6.084	0.017	0.821	0.013
1899	2902	-7.636	0.014	0.721	0.010
1900	2297	-7.073	0.017	0.770	0.014
1901	2262	-6.761	0.017	0.772	0.013
1902	2649	-8.117	0.016	0.737	0.011
1903	2227	-6.954	0.016	0.697	0.012
1904	1989	-7.005	0.016	0.657	0.012
1905	2673	-6.947	0.014	0.652	0.009
1906	3957	-5.765	0.014	0.831	0.011
1907	1999	-5.451	0.019	0.834	0.013
1908	2927	-7.310	0.014	0.707	0.010
1909	2875	-6.085	0.015	0.756	0.010
1910	3112	-6.701	0.015	0.746	0.010
1911	2217	-7.181	0.017	0.756	0.013

1912	1929	-5.947	0.018	0.744	0.013
1913	1980	-5.927	0.017	0.727	0.013
1914	2068	-4.421	0.017	0.779	0.013
1915	3765	-3.097	0.013	0.786	0.009
1916	2051	-4.300	0.017	0.708	0.014
1917	2172	-4.057	0.017	0.709	0.012
1918	3230	-4.183	0.014	0.747	0.011
1919	6409	-2.672	0.010	0.779	0.007
1920	3312	-1.239	0.014	0.807	0.010
1921	2874	-2.459	0.014	0.715	0.011
1922	2450	-2.080	0.015	0.731	0.011
1923	3896	-1.626	0.012	0.730	0.009
1924	4134	-2.452	0.012	0.741	0.009
1925	3485	-4.206	0.015	0.788	0.010
1926	2563	-4.886	0.015	0.700	0.011
1927	3762	-5.532	0.013	0.740	0.010
1928	4232	-4.754	0.012	0.715	0.010
1929	3678	-5.096	0.014	0.728	0.010
1930	2948	-4.355	0.015	0.764	0.011
1931	2847	-5.665	0.015	0.747	0.012
1932	3467	-5.355	0.014	0.788	0.010
1933	3579	-6.639	0.013	0.716	0.009
1934	3014	-5.155	0.016	0.849	0.013
1935	3416	-5.866	0.013	0.749	0.010
1936	3926	-5.807	0.013	0.777	0.009
1937	3667	-6.507	0.013	0.680	0.009
1938	2730	-7.569	0.013	0.623	0.009
1939	4060	-6.688	0.013	0.728	0.008
1940	3238	-5.621	0.015	0.772	0.011
1941	3443	-5.699	0.014	0.775	0.011
1942	4055	-6.761	0.012	0.666	0.008
1943	3571	-5.279	0.014	0.778	0.010
1944	3700	-4.676	0.014	0.775	0.010
1945	3876	-5.191	0.014	0.823	0.010
1946	3450	-5.346	0.014	0.781	0.010
1947	4116	-5.329	0.012	0.722	0.008
1948	2965	-4.155	0.013	0.706	0.010
1949	3522	-3.626	0.013	0.724	0.010
1950	3977	-3.500	0.012	0.734	0.009
1951	3933	-2.953	0.012	0.770	0.010

1952	6127	-3.537	0.011	0.775	0.008
1953	4898	-1.582	0.012	0.777	0.008
1954	3032	-1.290	0.014	0.753	0.011
1955	2907	-1.255	0.016	0.797	0.012
1956	2359	-1.257	0.017	0.772	0.013
1957	2637	-1.095	0.015	0.712	0.011
1958	2650	-1.869	0.015	0.792	0.011
1959	2322	-3.736	0.019	0.755	0.012
1960	3720	-3.680	0.013	0.712	0.009
1961	3758	-3.756	0.013	0.743	0.009
1962	2184	-4.301	0.017	0.693	0.011
1963	3494	-3.301	0.013	0.755	0.010
1964	2589	-3.441	0.015	0.774	0.011
1965	2308	-5.013	0.016	0.709	0.012
1966	2111	-4.396	0.018	0.763	0.014
1967	2317	-4.351	0.016	0.713	0.011
1968	2347	-3.773	0.017	0.841	0.013
1969	2488	-6.221	0.016	0.711	0.011
1970	2016	-3.185	0.020	0.927	0.016
1971	2748	-2.879	0.015	0.751	0.010
1972	2431	-2.516	0.017	0.840	0.013
1973	2140	-3.898	0.017	0.731	0.012
1974	2909	-2.240	0.017	0.869	0.012
1975	3207	-0.759	0.015	0.840	0.011
1976	3017	-1.374	0.014	0.792	0.011
1977	1963	-1.065	0.005	0.754	0.003
1978	2318	-1.458	0.016	0.714	0.011
1979	2086	-0.659	0.019	0.846	0.015
1980	2244	-2.093	0.016	0.774	0.012
1981	2360	-3.751	0.017	0.750	0.011
1982	3384	-3.676	0.013	0.698	0.010
1983	2879	-2.681	0.014	0.741	0.011
1984	2961	-3.687	0.014	0.675	0.011
1985	2273	-2.652	0.016	0.751	0.013
1986	6901	-3.739	0.010	0.755	0.007
1987	4684	-1.376	0.012	0.775	0.009
1988	3095	-0.446	0.015	0.809	0.011
1989	3027	-0.463	0.014	0.726	0.010
1990	3335	-0.739	0.014	0.751	0.010
1991	3304	-0.891	0.014	0.760	0.010

1992	3571	-2.207	0.013	0.731	0.010
1993	3770	-3.070	0.013	0.763	0.009
1994	3054	-3.101	0.015	0.783	0.011
1995	3095	-3.436	0.015	0.771	0.010
1996	3151	-4.287	0.014	0.727	0.010
1997	3793	-3.477	0.013	0.716	0.009
1998	3453	-3.609	0.013	0.692	0.010
1999	3649	-4.172	0.013	0.759	0.010
2000	4291	-4.538	0.012	0.741	0.009
2001	3456	-4.051	0.013	0.735	0.010
2002	4191	-3.668	0.012	0.738	0.009
2003	3672	-4.068	0.013	0.714	0.009
2004	3550	-2.643	0.014	0.792	0.011
2005	4105	-2.483	0.012	0.760	0.009
2006	3775	-2.036	0.013	0.811	0.010
2007	3112	-2.627	0.014	0.773	0.011
2008	3863	-2.747	0.014	0.807	0.011
2009	5160	-0.778	0.011	0.814	0.009
2010	5194	-1.067	0.011	0.763	0.008
2011	3921	-1.734	0.012	0.711	0.010
2012	3546	-1.907	0.013	0.704	0.010
2013	3740	-2.276	0.013	0.716	0.009
2014	3017	-1.259	0.014	0.805	0.011
2015	4620	-3.250	0.012	0.728	0.008
2016	2577	-3.768	0.016	0.724	0.012
2017	3431	-1.744	0.015	0.862	0.011
2018	3617	-2.025	0.013	0.779	0.010
2019	3493	-2.075	0.013	0.760	0.009
2020	5152	-2.831	0.012	0.822	0.009
2021	5401	-1.009	0.011	0.783	0.008
2022	4108	-1.432	0.012	0.761	0.009
2023	1972	-0.223	0.018	0.794	0.014
2024	7484	-0.217	0.010	0.818	0.008
2025	3822	-1.527	0.012	0.733	0.009
2026	3718	-1.270	0.013	0.830	0.010
2027	3287	-3.851	0.014	0.742	0.010
2028	3707	-3.598	0.013	0.753	0.009
2029	3316	-2.921	0.015	0.763	0.011
2030	3193	-3.660	0.013	0.737	0.010
2031	3801	-3.122	0.013	0.764	0.009

2032	4124	-3.264	0.012	0.749	0.009
2033	2938	-3.550	0.015	0.738	0.011
2034	3514	-3.623	0.014	0.730	0.010
2035	3691	-3.125	0.013	0.755	0.010
2036	3876	-3.224	0.013	0.781	0.009
2037	3568	-4.433	0.013	0.710	0.009
2038	12429	-2.423	0.007	0.790	0.005
2039	5770	-3.068	0.010	0.701	0.007
2040	4101	-2.295	0.013	0.765	0.009
2041	4437	-2.573	0.012	0.739	0.009
2042	4168	-2.687	0.013	0.775	0.009
2043	3391	-1.668	0.014	0.785	0.010
2044	3140	-1.039	0.014	0.770	0.011
2045	4017	-1.627	0.013	0.776	0.010
2046	5022	-1.821	0.011	0.679	0.008
2047	2663	-2.271	0.014	0.675	0.010
2048	3101	-1.696	0.014	0.739	0.010
2049	2771	-2.473	0.015	0.790	0.011
2050	3692	-3.709	0.012	0.665	0.009
2051	2762	-2.721	0.015	0.733	0.011
2052	3511	-3.508	0.013	0.755	0.010
2053	3959	-2.787	0.012	0.748	0.009
2054	5927	-4.295	0.010	0.722	0.007
2055	7140	-0.505	0.010	0.851	0.008
2056	3090	-1.250	0.014	0.762	0.010
2057	11024	-1.005	0.007	0.748	0.005
2058	3718	-1.692	0.013	0.757	0.009
2059	3709	-0.609	0.004	0.784	0.003
2060	4026	-1.253	0.014	0.848	0.010
2061	15900	-2.955	0.006	0.766	0.004
2062	6049	-3.354	0.010	0.742	0.008
2063	3737	-3.109	0.013	0.728	0.009
2064	2694	-2.914	0.015	0.748	0.011
2065	2740	-3.185	0.015	0.743	0.011
2066	3148	-3.436	0.013	0.715	0.010
2067	3894	-3.922	0.012	0.715	0.010
2068	3185	-3.351	0.014	0.767	0.010
2069	2882	-3.609	0.014	0.704	0.011
2070	2378	-3.100	0.017	0.791	0.013
2071	2183	-3.625	0.016	0.711	0.013

2072	3111	-2.667	0.015	0.784	0.011
2073	2670	-2.132	0.016	0.788	0.013
2074	2384	-2.607	0.016	0.745	0.012
2075	6363	-2.512	0.011	0.807	0.008
2076	5567	-2.218	0.011	0.827	0.008
2077	2779	-2.248	0.014	0.701	0.009
2078	1802	-1.254	0.019	0.789	0.015
2079	2042	-1.667	0.017	0.707	0.013
2080	1859	-1.397	0.017	0.684	0.014
2081	2519	-1.536	0.015	0.731	0.011
2082	1973	-1.101	0.018	0.787	0.014
2083	3021	-2.713	0.016	0.832	0.012
2084	2268	-2.688	0.017	0.783	0.013
2085	2518	-2.489	0.016	0.773	0.012
2086	2627	-2.941	0.015	0.730	0.011
2087	2358	-2.702	0.016	0.737	0.011
2088	2130	-2.806	0.019	0.784	0.014
2089	4743	-0.877	0.013	0.864	0.010
2090	2663	-1.438	0.016	0.770	0.012
2091	3436	-1.853	0.013	0.679	0.010
2092	2539	-0.996	0.016	0.772	0.013
2093	2960	-1.396	0.015	0.752	0.011
2094	2798	-1.095	0.016	0.865	0.013
2095	2801	-3.662	0.016	0.787	0.011
2096	3275	-4.073	0.013	0.674	0.009
2097	3492	-2.870	0.015	0.810	0.010
2098	2675	-2.883	0.016	0.828	0.013
2099	3523	-3.726	0.013	0.754	0.010
2100	2984	-3.895	0.015	0.775	0.011
2101	3330	-4.696	0.014	0.784	0.010
2102	3254	-3.959	0.014	0.731	0.010
2103	2345	-3.460	0.016	0.738	0.012
2104	2082	-3.444	0.017	0.772	0.013
2105	3458	-4.381	0.014	0.717	0.009
2106	3110	-3.648	0.014	0.770	0.012
2107	2189	-3.381	0.016	0.703	0.012
2108	3705	-3.697	0.013	0.738	0.010
2109	2773	-3.836	0.015	0.737	0.011
2110	2753	-4.101	0.016	0.769	0.011
2111	2646	-2.397	0.015	0.762	0.011

2112	2497	-1.024	0.016	0.797	0.012
2113	1836	-1.465	0.018	0.765	0.013
2114	1891	-1.623	0.019	0.748	0.015
2115	1900	-1.689	0.018	0.748	0.012
2116	1692	-2.183	0.018	0.732	0.014
2117	2611	-2.604	0.016	0.792	0.012
2118	1899	-2.678	0.019	0.806	0.015
2119	2656	-5.116	0.016	0.739	0.011
2120	2307	-2.830	0.017	0.811	0.012
2121	1515	-2.198	0.023	0.829	0.018
2122	4714	-3.490	0.011	0.728	0.008
2123	8618	-2.405	0.009	0.772	0.007
2124	2854	-1.467	0.014	0.769	0.011
2125	1708	-1.172	0.020	0.781	0.015
2126	1699	-1.856	0.019	0.789	0.014
2127	1680	-1.722	0.019	0.783	0.015
2128	1748	-1.489	0.021	0.867	0.016
2129	1434	-3.249	0.021	0.795	0.016
2130	1570	-3.634	0.020	0.793	0.016
2131	1555	-4.703	0.020	0.729	0.014
2132	1831	-5.554	0.018	0.643	0.013
2133	1032	-3.728	0.025	0.754	0.020
2134	1642	-3.492	0.020	0.777	0.015
2135	1598	-3.810	0.020	0.791	0.015
2136	1305	-4.633	0.024	0.795	0.017
2137	1651	-3.834	0.021	0.821	0.016
2138	1200	-6.006	0.024	0.799	0.018
2139	1303	-4.594	0.022	0.771	0.017
2140	1373	-3.771	0.021	0.734	0.016
2141	1080	-2.635	0.026	0.831	0.022
2142	1262	-3.768	0.022	0.746	0.016
2143	1163	-3.654	0.023	0.782	0.018
2144	1487	-3.818	0.021	0.794	0.016
2145	1105	-1.434	0.026	0.902	0.020
2146	1307	-1.206	0.022	0.774	0.016
2147	1012	-0.683	0.027	0.846	0.023
2148	1127	-1.966	0.023	0.754	0.016
2149	1203	-2.125	0.025	0.773	0.018
2150	1158	-2.386	0.025	0.824	0.021
2151	1475	-3.517	0.021	0.786	0.015

2152	3398	-3.409	0.014	0.829	0.012
2153	5128	-3.744	0.012	0.801	0.008
2154	1887	-3.578	0.019	0.765	0.014
2155	1672	-3.491	0.020	0.799	0.015
2156	5746	-3.502	0.012	0.863	0.008