HANUL Meeting

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Signal MC Study, $\Omega^{*-} \to \Omega^{-}\gamma$

■ EvtGen

→ Xi*- in a particle table changed to Ω^{*-} (mass: 1.8 GeV, spin: 3/2, charge: -1)

add	p	Baryon	Xi0	3322	1.31483	0	0	0	1	87.1	339
add	p	Baryon	anti-Xi0	-3322	1.31483	0	0	0	1	87.1	0
add	p	Baryon	Xi-	3312	1.32131	0	0	-3	1	49.1	338
add	p	Baryon	anti-Xi+	-3312	1.32131	0	0	3	1	49.1	0
add	p	Baryon	Xi*0	3324	1.5318	0.0091	0.06	0	3	0	369
add	p	Baryon	anti-Xi*0	-3324	1.5318	0.0091	0.06	0	3	0	0
*add	p	Baryon	Xi*-	3314	1.5350	0.0099	0.06	-3	3	0	368
*add	p	Baryon	anti-Xi*+	-3314	1.5350	0.0099	0.06	3	3	0	0
add	p	Baryon	Xi*-	3314	1.800	0.0	0.0	-3	3	0	368
add	p	Baryon	anti-Xi*+	-3314	1.800	0.0	0.0	3	3	0	0
add	p	Baryon	Xi(1820)0	13324	1.823	0.024	0.34	0	3	0	0
add	p	Baryon	anti-Xi(1820)0	-13324	1.823	0.024	0.34	0	3	0	0
add	p	Baryon	Xi(1820)-	13314	1.823	0.024	0.34	-3	3	0	0
add	p	Baryon	anti-Xi(1820)+	-13314	1.823	0.024	0.34	3	3	0	0

→ Start with $\Upsilon(1S)$

$\Upsilon(1S)$→Xi*- + X (inclusive)

Xi*- → $\Omega^{-}\gamma$

(Ω^{-} decay controlled in Geant3)

→ Produced particles in EvtGen

ID	ISTHEP	IDHEP	MOTHER	MO(1)	MO(2)	DA(1)	DA(2)	P(1)	P(2)	P(3)	P(4)	P(5)	V(1)	V(2)	V(3)	V(4)
1	2	553	0	0	0	2	2	0.16	0.00	4.02	10.28	9.46	-0.03	0.01	-3.79	-0.63
2	2	92	1	1	1	3	10	0.16	0.00	4.02	10.28	9.46	-0.03	0.01	-3.79	-0.63
3	2	311	2	2	2	11	11	0.55	0.25	0.57	0.97	0.50	-0.03	0.01	-3.79	-0.63
4	2	-311	2	2	2	12	12	0.21	0.20	0.40	0.70	0.50	-0.03	0.01	-3.79	-0.63
5	2	311	2	2	2	13	13	-0.85	-1.15	2.16	2.64	0.50	-0.03	0.01	-3.79	-0.63
6	1	211	2	2	2	0	0	0.42	-0.28	-0.38	0.64	0.14	-0.03	0.01	-3.79	-0.63
7	2	223	2	2	2	14	16	0.65	0.57	0.57	1.31	0.79	-0.03	0.01	-3.79	-0.63
8	1	-211	2	2	2	0	0	-0.57	0.00	-0.05	0.59	0.14	-0.03	0.01	-3.79	-0.63
9	2	-3114	2	2	2	19	20	0.27	0.40	0.65	1.56	1.34	-0.03	0.01	-3.79	-0.63
10	2	3314	2	2	2	21	22	-0.51	0.01	0.10	1.87	1.80	-0.03	0.01	-3.79	-0.63
11	1	310	3	3	3	0	0	0.55	0.25	0.57	0.97	0.50	-0.03	0.01	-3.79	-0.63
12	1	310	4	4	4	0	0	0.21	0.20	0.40	0.70	0.50	-0.03	0.01	-3.79	-0.63
13	1	130	5	5	5	0	0	-0.85	-1.15	2.16	2.64	0.50	-0.03	0.01	-3.79	-0.63
14	1	-211	7	7	7	0	0	0.02	0.16	0.01	0.21	0.14	-0.03	0.01	-3.79	-0.63
15	1	211	7	7	7	0	0	0.64	0.21	0.38	0.79	0.14	-0.03	0.01	-3.79	-0.63
16	2	111	7	7	7	17	18	-0.01	0.21	0.18	0.31	0.13	-0.03	0.01	-3.79	-0.63
17	1	22	16	16	16	0	0	-0.01	0.23	0.16	0.28	0.00	-0.03	0.01	-3.79	-0.63
18	1	22	16	16	16	0	0	-0.01	-0.02	0.02	0.03	0.00	-0.03	0.01	-3.79	-0.63
19	1	-3122	9	9	9	0	0	0.07	0.36	0.50	1.28	1.12	-0.03	0.01	-3.79	-0.63
20	1	211	9	9	9	0	0	0.20	0.04	0.15	0.29	0.14	-0.03	0.01	-3.79	-0.63
21	1	3334	10	10	10	0	0	-0.44	-0.05	0.19	1.74	1.67	-0.03	0.01	-3.79	-0.63
22	1	22	10	10	10	0	0	-0.07	0.06	-0.09	0.13	0.00	-0.03	0.01	-3.79	-0.63

$\Upsilon(1S)$→Xi*- + X (inclusive)

Xi*- → $\Omega^{-}\gamma$

→ Produced particles in Geant, $\Omega^{-} \rightarrow \Lambda K^{-}$

ID	ISTHEP	IDHEP	MOTHER	MO(1)	MO(2)	DA(1)	DA(2)	P(1)	P(2)	P(3)	P(4)	P(5)	V(1)	V(2)	V(3)	V(4)
1	2	553	0	0	0	2	2	0.16	0.00	4.02	10.28	9.46	0.45	-0.08	-2.64	-0.44
2	2	92	1	1	1	3	9	0.16	0.00	4.02	10.28	9.46	0.45	-0.08	-2.64	-0.44
3	2	-3214	2	2	2	10	11	0.68	-0.01	0.73	1.68	1.35	0.45	-0.08	-2.64	-0.44
4	2	3314	2	2	2	14	15	-0.34	0.30	-0.07	1.86	1.80	0.45	-0.08	-2.64	-0.44
5	2	313	2	2	2	16	17	0.18	0.02	-0.29	0.95	0.89	0.45	-0.08	-2.64	-0.44
6	2	113	2	2	2	18	19	-0.02	-0.22	0.37	0.91	0.80	0.45	-0.08	-2.64	-0.44
7	2	213	2	2	2	20	21	0.37	0.01	0.13	0.84	0.74	0.45	-0.08	-2.64	-0.44
8	2	111	2	2	2	24	25	-0.59	-1.04	2.09	2.41	0.13	0.45	-0.08	-2.64	-0.44
9	2	113	2	2	2	26	27	-0.12	0.93	1.06	1.63	0.80	0.45	-0.08	-2.64	-0.44
10	1	-3122	3	3	3	28	29	0.59	0.16	0.57	1.39	1.12	0.45	-0.08	-2.64	-0.44
11	2	111	3	3	3	12	13	0.09	-0.17	0.16	0.29	0.13	0.45	-0.08	-2.64	-0.44
12	1	22	11	11	11	0	0	0.04	-0.18	0.09	0.20	0.00	0.45	-0.08	-2.64	-0.44
13	1	22	11	11	11	0	0	0.05	0.00	0.06	0.08	0.00	0.45	-0.08	-2.64	-0.44
14	1	3334	4	4	4	30	31	-0.33	0.40	-0.05	1.75	1.67	0.45	-0.08	-2.64	-0.44
15	1	22	4	4	4	0	0	-0.02	-0.10	-0.02	0.11	0.00	0.45	-0.08	-2.64	-0.44
16	1	321	5	5	5	32	34	0.10	0.29	-0.10	0.59	0.49	0.45	-0.08	-2.64	-0.44
17	1	-211	5	5	5	0	0	0.09	-0.26	-0.19	0.37	0.14	0.45	-0.08	-2.64	-0.44
18	1	211	6	6	6	35	35	-0.20	-0.01	-0.16	0.29	0.14	0.45	-0.08	-2.64	-0.44
19	1	-211	6	6	6	36	37	0.18	-0.21	0.53	0.62	0.14	0.45	-0.08	-2.64	-0.44
20	1	211	7	7	7	38	38	-0.12	-0.07	-0.16	0.25	0.14	0.45	-0.08	-2.64	-0.44
21	2	111	7	7	7	22	23	0.49	0.08	0.29	0.59	0.13	0.45	-0.08	-2.64	-0.44
22	1	22	21	21	21	0	0	0.17	-0.03	0.11	0.21	0.00	0.45	-0.08	-2.64	-0.44
23	1	22	21	21	21	0	0	0.32	0.12	0.17	0.38	0.00	0.45	-0.08	-2.64	-0.44
24	1	22	8	8	8	39	40	-0.53	-0.82	1.72	1.98	0.00	0.45	-0.08	-2.64	-0.44
25	1	22	8	8	8	0	0	-0.07	-0.22	0.37	0.43	0.00	0.45	-0.08	-2.64	-0.44
26	1	211	9	9	9	41	45	-0.40	0.72	0.60	1.03	0.14	0.45	-0.08	-2.64	-0.44
27	1	-211	9	9	9	46	46	0.28	0.21	0.46	0.60	0.14	0.45	-0.08	-2.64	-0.44
28	-10	211	10	10	0	50	50	0.17	0.08	0.04	0.24	0.14	68.92	19.05	63.80	162.37
29	-10	-2212	10	10	0	47	49	0.42	0.09	0.52	1.16	0.94	68.92	19.05	63.80	162.37
30	-10	-321	14	14	0	67	67	0.04	-0.00	-0.11	0.51	0.49	-11.34	14.36	-4.45	62.67
31	-10	3122	14	14	0	65	66	-0.37	0.39	0.06	1.24	1.12	-11.34	14.36	-4.45	62.67
32	-10	111	16	16	0	73	74	-0.02	0.00	-0.06	0.15	0.13	270.98	355.40	-165.01	903.28
33	-10	211	16	16	0	0	0	0.21	0.12	-0.00	0.28	0.14	270.98	355.40	-165.01	903.28
34	-10	111	16	16	0	75	76	0.06	0.04	-0.05	0.16	0.13	270.98	355.40	-165.01	903.28
35	-10	-13	18	18	0	77	77	0.07	0.10	-0.06	0.18	0.11	-427.63	666.48	-775.84	1405.62
36	-10	22	19	19	0	0	0	0.15	0.10	0.20	0.27	0.00	942.92	-31.51	2021.66	2347.99
37	-10	22	19	19	0	0	0	0.16	0.00	0.07	0.18	0.00	942.92	-31.51	2021.66	2347.99
38	-10	-13	20	20	0	78	78	0.01	0.02	-0.02	0.11	0.11	-267.57	450.21	-1110.01	7072.9

→ Cut condition

Kaon: $R(K|\pi) > 0.9$, $R(K|p) > 0.4$, $R(e) < 0.9$, $|ip_r| < 20.0$ cm, $|ip_z| < 20.0$ cm, and more than 1 hit for both SVD r-phi and z.

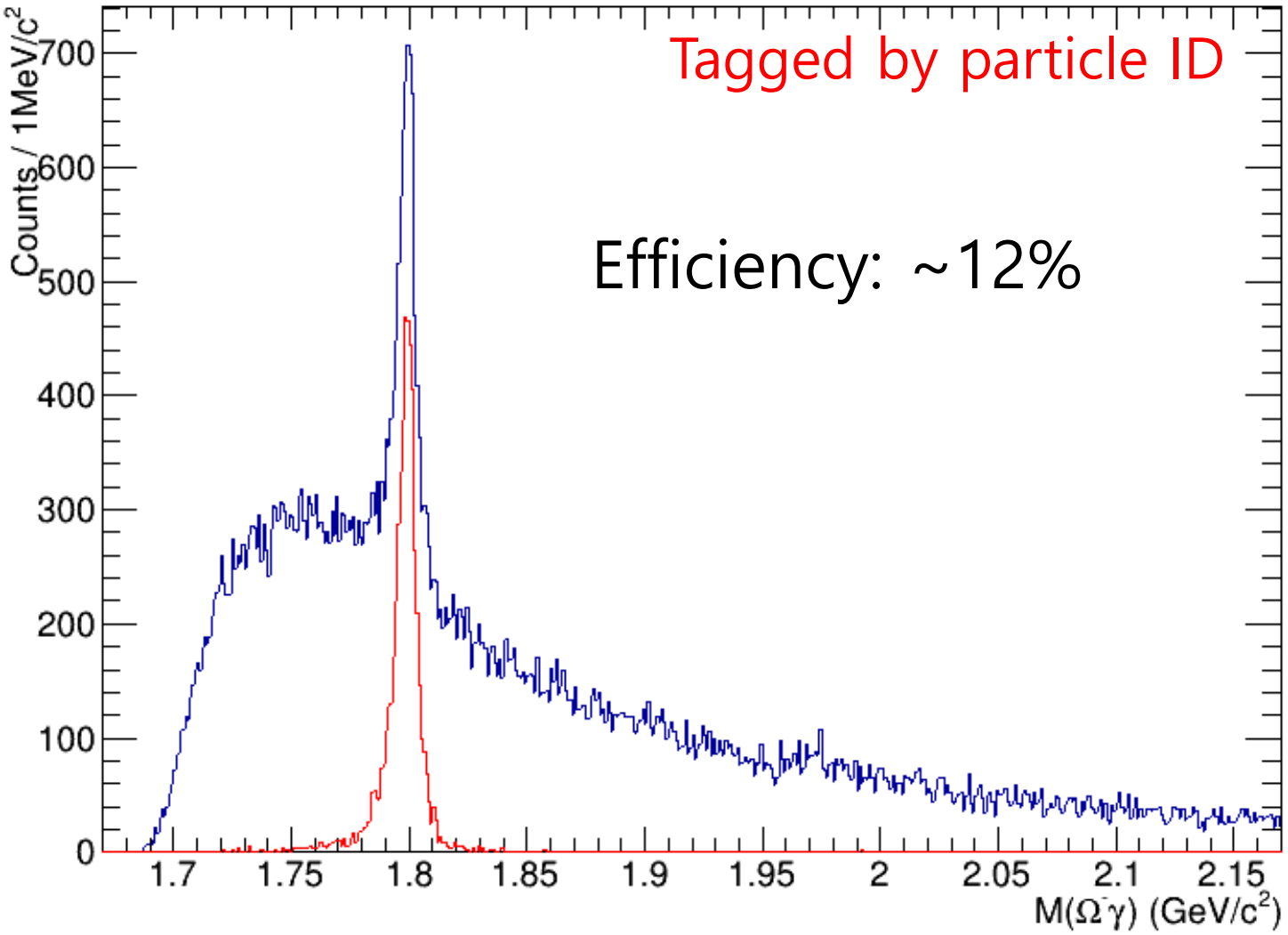
Lambda: GoodLambda=2 and $M(p\pi^-)$ in ~±5σ

Omega: $1.665 < M(\Lambda K^-) < 1.680$

gamma: E>50 MeV

→ Efficiency

Total 100,000 events generated and ~5,300 events remained.



HypTPC Simulation

■ Work list

→우승, 성욱

-Make the 'detector construction' near the hypTPC as close to real as possible. (Liq. H2 target, 12C target, TPC case, …).

-Add the KURAMA part and the new detectors (FAC, WAC, …).

→병민

-Make the event generator part. If possible, separate the event generator part and the Geant4 part.

→신형

-Make a digitization (simulation data → real data). Especially, the hypTPC part.

→성배, 신형

-Make a tracking tool for the hypTPC (cluster → tracking). If possible, prepare a full analysis program.

■ Work place

→nuclear.korea.ac.kr server

-Temporarily on samba server.

-Copy the simulation program to your work folder.

/home/samba.old/JPARC_E42/HypTPC_Simulation/Geant4/

-Bash setting

/home/samba.old/JPARC_E42/software/bash_example/

bashrc_example.sh

→KEKCC server

-Simulation program

/group/had/sks/Users/sbyang/HypTPC_Simulation/sim_dev/

Geant4

-Bash example

/home/had/sbyang/.bashrc

→GITHUB will be soon prepared