

# Topology Analysis <sup>\*†‡§</sup>

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<sup>†</sup>This package is implemented referring to a program called TOPO, which is first developed by Prof. Shuxian Du from Zhengzhou University and later extended and maintained by Prof. Gang Li from Institute of High Energy Physics, Chinese Academy of Sciences. The TOPO program has been widely used by colleagues in BESIII collaboration. Several years ago, when I was a Ph.D. student working on the BESIII experiment, I learned the idea of topology analysis and a lot of programming techniques from the TOPO program. So, I really appreciate the original works of Prof. Du and Prof. Li very much. To meet my own needs and to practice developing analysis tools with C++, ROOT, and LaTeX, I wrote the package from scratch. At that time, the package functioned well but was relatively simple. At the end of 2017, when I just started my post-doctoral research at Beihang University, my co-supervisor Prof. Chengping Shen reminded me that it could be a useful tool for the Belle II experiment as well. So, I revised and extended it, making it more well-rounded and suitable for the Belle II experiment. Now, it also applies to many other similar high energy physics experiments. Here, I would like to thank Prof. Du and Prof. Li for their original works, and Prof. Shen for his suggestion, guidance, support, and encouragement.

<sup>‡</sup>Besides, I would like to thank all of the people who have helped me in the development of the program. I am particularly grateful to Prof. Xingtao Huang for his comments on the principles and styles of the program, to Remco de Boer for his suggestions on the tex output and the use of GitHub, and to Xi Chen for his discussions on the core algorithms. I am especially indebted to Prof. Xiqing Hao, Longke Li, Xiaoping Qin, Ilya Komarov, Yubo Li, Guanda Gong, Suxian Li, Junhao Yin, Prof. Xiaolong Wang, Yeqi Chen, Hannah Wakeling, Hongrong Qi, Hui Li, Ning Cao, Sanjeeda Bharati Das, Kazuki Kojima, Tingting Han, Fang Yan, Lin Wang, Meiru An, and Noreen Rauls for their advice in extending and perfecting the program. Also, I thank Xi'an Xiong, Runqiu Ma, Wencheng Yan, Sen Jia, Lu Cao, Dong Liu, Hongpeng Wang, Jiawei Zhang, Jiajun Liu, Maoqiang Jing, Yi Zhang, Wei Shan, and Yadi Wang for their efforts in helping me test the program.

<sup>§</sup>The paper on the tool has been published by *Computer Physics Communications*. You can find this paper and the preprint corresponding to it in the links [Comput. Phys. Commun. 258 \(2021\) 107540](#) and [arXiv:2001.04016](#), respectively. If the tool really helps your researches, we would appreciate it very much if you could cite the paper in your publications.

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Table 1: Decay trees and their respective initial-final states.

rowNo	decay tree (decay initial-final states)	iDcyTr	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
1	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^+K^+K^-$ , $\rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$ )	2902	2	107	95	202	202
2	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^-\gamma^I$ , $\rho^0 \rightarrow \pi^+\pi^-$ , $\rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$ )	835	11	83	101	184	386
3	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^+K^+K^-$ , $\rho^0 \rightarrow \pi^+\pi^-$ , $\rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$ )	277	34	92	76	168	554
4	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^+K^+K^-\gamma^I$ , $\rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$ )	2221	54	76	83	159	713
5	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^-, \rho^0 \rightarrow \pi^+\pi^-$ , $\rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-$ )	285	252	75	83	158	871
6	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^-\omega\gamma^I$ , $\rho^- \rightarrow \pi^0\pi^-$ , $\omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$ )	86	84	68	79	147	1018
7	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\omega$ , $\rho^0 \rightarrow \pi^+\pi^-$ , $\rho^+ \rightarrow \pi^0\pi^+$ , $\omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$ )	222	205	87	59	146	1164
8	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\omega\gamma^I$ , $\rho^0 \rightarrow \pi^+\pi^-$ , $\rho^+ \rightarrow \pi^0\pi^+$ , $\omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$ )	2686	145	70	76	146	1310
9	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^+\omega K^+K^-$ , $\rho^+ \rightarrow \pi^0\pi^+$ , $\omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$ )	1257	91	69	72	141	1451
10	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^-\omega\gamma^I$ , $\rho^- \rightarrow \pi^0\pi^-$ , $\omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$ )	1365	270	58	80	138	1589
11	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\rho^-, \rho^0 \rightarrow \pi^+\pi^-$ , $\rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-$ )	395	51	65	71	136	1725
12	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^-K^+K^-$ , $\rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$ )	1455	112	72	64	136	1861
13	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\gamma^I$ , $\rho^0 \rightarrow \pi^+\pi^-$ , $\rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$ )	152	84	61	69	130	1991
14	$e^+e^- \rightarrow \pi^0\rho^0\pi^-\rho^+K^+K^-\gamma^I$ , $\rho^0 \rightarrow \pi^+\pi^-$ , $\rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$ )	1891	54	62	64	126	2117
15	$e^+e^- \rightarrow \pi^+\pi^-\pi^-\rho^+K^+K^-\gamma^I$ , $\rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I$ )	957	109	58	67	125	2242
16	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\rho^+\gamma^I$ , $\rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$ )	1006	11	64	59	123	2365
17	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\rho^-\omega K^+K^-$ , $\rho^- \rightarrow \pi^0\pi^-$ , $\omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$ )	545	34	67	55	122	2487

rowNo	decay tree (decay initial-final states)	iDcyTr	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
18	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^+K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	1351	19	69	53	122	2609
19	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\rho^-\omega, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	2681	51	53	66	119	2728
20	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-\gamma^I, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\gamma^I)$	796	581	53	64	117	2845
21	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-\omega, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	1991	204	69	46	115	2960
22	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\rho^-K^+K^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-)$	4024	2	57	58	115	3075
23	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\rho^+, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	426	156	52	59	111	3186
24	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\omega K^+K^-, \rho^0 \rightarrow \pi^+\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-)$	462	34	111	—	111	3297
25	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\rho^-\omega, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	1839	205	47	64	111	3408
26	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\rho^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-)$	3105	252	57	54	111	3519
27	$e^+e^- \rightarrow \pi^0\pi^0\rho^+\pi^-\pi^-\rho^+\omega, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	677	98	61	48	109	3628
28	$e^+e^- \rightarrow \pi^0\pi^-\rho^+\omega K^+K^-, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-)$	1866	112	60	49	109	3737
29	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\omega\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	128	124	108	—	108	3845
30	$e^+e^- \rightarrow \pi^+\pi^-\rho^-K^+K^-\gamma^I, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	5867	19	47	61	108	3953
31	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^-\omega K^+K^-\gamma^I, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	915	140	50	56	106	4059
32	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\rho^-\gamma^I\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I\gamma^I)$	18	18	51	54	105	4164
33	$e^+e^- \rightarrow \pi^+\pi^-\rho^-K^+K^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^-\pi^-K^+K^-)$	305	266	58	46	104	4268
34	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^-K^+K^-\gamma^I, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	1235	395	50	54	104	4372
35	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\pi^-\rho^+\gamma^I, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	1902	84	58	46	104	4476

rowNo	decay tree (decay initial-final states)	iDcyTr	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
36	$e^+e^- \rightarrow \pi^0\rho^0\rho^0\pi^+\pi^-\pi^-\rho^+\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	3780	124	50	54	104	4580
37	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\rho^+\omega\gamma^I, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	7238	145	53	51	104	4684
38	$e^+e^- \rightarrow \pi^0\pi^-\rho^+K^+K^-\gamma^I, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-K^+K^-\gamma^I)$	6463	838	40	63	103	4787
39	$e^+e^- \rightarrow \rho^0\pi^+\pi^-\rho^-K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	468	272	46	56	102	4889
40	$e^+e^- \rightarrow \pi^0\pi^+\rho^-\omega K^+K^-\gamma^I, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	497	395	52	50	102	4991
41	$e^+e^- \rightarrow \rho^0\pi^+\pi^-\pi^-\rho^+K^+K^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-)$	1816	27	42	60	102	5093
42	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	113	109	101	—	101	5194
43	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^-\gamma^I, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\gamma^I)$	6365	94	49	52	101	5295
44	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\omega, \rho^0 \rightarrow \pi^+\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	3406	156	100	—	100	5395
45	$e^+e^- \rightarrow \pi^+\pi^-\pi^-\rho^+\gamma^I, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\gamma^I)$	582	440	44	53	97	5492
46	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-\pi^-)$	1	1	46	50	96	5588
47	$e^+e^- \rightarrow \rho^0\pi^+\pi^+\pi^-\rho^-\omega\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	4693	124	51	43	94	5682
48	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\pi^-\rho^+\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	574	124	56	37	93	5775
49	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\omega\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	1770	506	51	40	91	5866
50	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+\rho^-K^+K^-, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-)$	2647	112	91	—	91	5957
51	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+\rho^-K^+K^-\gamma^I, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	1494	395	90	—	90	6047
52	$e^+e^- \rightarrow \pi^0\rho^0\rho^0\pi^+\pi^+\pi^-\rho^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	3432	156	38	52	90	6137
53	$e^+e^- \rightarrow \rho^0\pi^+\pi^+\pi^-\rho^-\omega, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	1584	156	43	46	89	6226

rowNo	decay tree (decay initial-final states)	iDcyTr	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
54	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\rho^+\rho^-, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-$ )	2182	51	89	—	89	6315
55	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-\pi^-\rho^+\omega, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$ )	2745	156	45	44	89	6404
56	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\rho^+, \rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$ )	516	51	45	43	88	6492
57	$e^+e^- \rightarrow \pi^0\pi^+\pi^-K^+K^-\gamma^I$ ( $e^+e^- \dashrightarrow \pi^0\pi^+\pi^-K^+K^-\gamma^I$ )	1751	197	87	—	87	6579
58	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\rho^+\rho^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-$ )	605	51	86	—	86	6665
59	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\omega K^+K^-\gamma^I, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$ )	823	54	86	—	86	6751
60	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$ )	532	2	85	—	85	6836
61	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\omega K^+K^-\gamma^I, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I$ )	566	395	85	—	85	6921
62	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\rho^+\rho^-\gamma^I, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\gamma^I$ )	751	84	85	—	85	7006
63	$e^+e^- \rightarrow \pi^0\rho^0\pi^-\rho^+\omega K^+K^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-K^+K^-$ )	663	91	44	40	84	7090
64	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\omega K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$ )	1924	19	84	—	84	7174
65	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\rho^+\rho^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\gamma^I$ )	1004	84	83	—	83	7257
66	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+K^+K^-\gamma^I\gamma^I, \rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I\gamma^I$ )	3159	213	45	38	83	7340
67	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\omega K^+K^-, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$ )	2	2	82	—	82	7422
68	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-\rho^-\omega\gamma^I, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$ )	1082	124	38	44	82	7504
69	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\omega K^+K^-, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-K^+K^-$ )	500	34	81	—	81	7585
70	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\rho^-\omega, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$ )	567	98	47	34	81	7666
71	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\rho^+, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ ( $e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$ )	1487	205	44	37	81	7747

rowNo	decay tree (decay initial-final states)	iDcyTr	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
72	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-\rho^+\gamma^I, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	4565	105	35	46	81	7828
73	$e^+e^- \rightarrow \rho^0\pi^+\pi^-\omega K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	1450	272	80	—	80	7908
74	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^+\rho^+, \rho^+ \rightarrow \pi^0\pi^+, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	1490	204	36	44	80	7988
75	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	2664	272	79	—	79	8067
76	$e^+e^- \rightarrow \rho^0\pi^+\pi^+\pi^-\pi^-\rho^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-)$	37	37	41	36	77	8144
77	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\omega K^+K^-\gamma^I, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	560	19	77	—	77	8221
78	$e^+e^- \rightarrow \rho^0\pi^+\pi^-\rho^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\gamma^I)$	1740	105	40	37	77	8298
79	$e^+e^- \rightarrow \pi^+\pi^-\rho^+\rho^-K^+K^-\gamma^I, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	1864	54	76	—	76	8374
80	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-K^+K^-, \rho^0 \rightarrow \pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-)$	6862	266	76	—	76	8450
81	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+\rho^-\omega, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-)$	3889	204	75	—	75	8525
82	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\rho^-, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-)$	4397	204	75	—	75	8600
83	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\pi^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\gamma^I)$	7056	11	75	—	75	8675
84	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\omega\gamma^I, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	11	11	74	—	74	8749
85	$e^+e^- \rightarrow \rho^0\pi^-\rho^+K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	1503	109	45	29	74	8823
86	$e^+e^- \rightarrow \pi^0\pi^0\pi^-\rho^+\omega K^+K^-, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-)$	2372	62	38	36	74	8897
87	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^-\rho^-K^+K^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-)$	2393	112	42	32	74	8971
88	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\rho^-\omega K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^- \rightarrow \pi^0\pi^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I)$	311	140	32	41	73	9044
89	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\rho^+\rho^-, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-)$	9889	205	73	—	73	9117

rowNo	decay tree (decay initial-final states)	iDcyTr	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
90	$e^+e^- \rightarrow \rho^0\pi^+\pi^+\pi^-\pi^-\rho^+\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-\gamma^I)$	376	316	40	32	72	9189
91	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-)$	4263	266	72	—	72	9261
92	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	4660	105	72	—	72	9333
93	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+\omega\gamma^I\gamma^I, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I\gamma^I)$	14171	373	41	31	72	9405
94	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^+\pi^-\pi^-K^+K^-, \rho^0 \rightarrow \pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-)$	657	27	71	—	71	9476
95	$e^+e^- \rightarrow \pi^+\pi^-\rho^+\rho^-K^+K^-, \rho^+ \rightarrow \pi^0\pi^+, \rho^- \rightarrow \pi^0\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-)$	1190	2	71	—	71	9547
96	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\omega K^+K^-, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-)$	1587	112	71	—	71	9618
97	$e^+e^- \rightarrow \pi^-\rho^+K^+K^-\gamma^I, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^-K^+K^-\gamma^I)$	4412	197	35	36	71	9689
98	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^-\rho^+K^+K^-\gamma^I, \rho^0 \rightarrow \pi^+\pi^-, \rho^+ \rightarrow \pi^0\pi^+$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	5620	395	31	40	71	9760
99	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$ $(e^+e^- \dashrightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I)$	2512	109	70	—	70	9830
100	$e^+e^- \rightarrow \pi^+\pi^-\pi^-\rho^+\omega\gamma^I, \rho^+ \rightarrow \pi^0\pi^+, \omega \rightarrow \pi^0\pi^+\pi^-$ $(e^+e^- \dashrightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I)$	879	11	32	37	69	9899
rest	$e^+e^- \rightarrow \text{others (112772 in total)}$ $(e^+e^- \dashrightarrow \text{corresponding to others})$	—	—	—	—	206897	216796

Table 2: Decay initial-final states.

rowNo	decay initial-final states	iDcyIFSts	nEtr	nCcEtr	nAllEtr	nCEtr
1	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$	91	1785	—	1785	1785
2	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$	34	1764	—	1764	3549
3	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	140	1565	—	1565	5114
4	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	19	1526	—	1526	6640
5	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$	205	1275	—	1275	7915
6	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$	112	1248	—	1248	9163
7	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$	2	1214	—	1214	10377
8	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	145	1201	—	1201	11578
9	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I$	54	1190	—	1190	12768
10	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$	395	1172	—	1172	13940
11	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$	102	1152	—	1152	15092
12	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	84	1095	—	1095	16187
13	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-$	51	1077	—	1077	17264
14	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$	98	1027	—	1027	18291
15	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-$	156	1015	—	1015	19306
16	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-$	204	993	—	993	20299
17	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	124	981	—	981	21280
18	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	97	951	—	951	22231
19	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-\gamma^I$	506	915	—	915	23146
20	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	270	910	—	910	24056
21	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$	27	909	—	909	24965
22	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	11	897	—	897	25862
23	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$	62	876	—	876	26738
24	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	272	874	—	874	27612
25	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I$	128	842	—	842	28454
26	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$	466	817	—	817	29271
27	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-$	252	803	—	803	30074
28	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	25	361	439	800	30874
29	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-$	310	760	—	760	31634
30	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-K^+\gamma^I$	152	318	409	727	32361
31	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^-\pi^-K^+$	207	313	407	720	33081
32	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	81	712	—	712	33793

rowNo	decay initial-final states	iDcyIFSts	nEtr	nCcEtr	nAllEtr	nCEtr
33	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^-$	473	371	323	694	34487
34	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	235	692	—	692	35179
35	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-K^-\gamma^I$	168	374	317	691	35870
36	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	83	319	367	686	36556
37	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$	109	684	—	684	37240
38	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^+\pi^-\pi^-K^+\gamma^I$	10	319	361	680	37920
39	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	163	671	—	671	38591
40	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	116	669	—	669	39260
41	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^+\pi^-\pi^-K^+$	147	313	344	657	39917
42	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$	274	653	—	653	40570
43	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	213	640	—	640	41210
44	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	323	614	—	614	41824
45	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-$	188	606	—	606	42430
46	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^-\pi^-K^+\gamma^I$	68	276	328	604	43034
47	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^-\gamma^I$	184	283	300	583	43617
48	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	638	269	305	574	44191
49	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	123	259	314	573	44764
50	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^+\pi^+\pi^-\pi^-K^-$	354	281	292	573	45337
51	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-$	355	563	—	563	45900
52	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^+\pi^-\pi^-K^+$	41	255	305	560	46460
53	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	574	557	—	557	47017
54	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$	289	536	—	536	47553
55	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-K^+K^-$	266	532	—	532	48085
56	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I\gamma^I$	825	532	—	532	48617
57	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I\gamma^I$	373	527	—	527	49144
58	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	13	524	—	524	49668
59	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-\gamma^I$	99	506	—	506	50174
60	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^+\pi^+\pi^-\pi^-K^-\gamma^I$	175	280	225	505	50679
61	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-K^+K^-$	767	500	—	500	51179
62	$e^+e^- \rightarrow \pi^0\pi^0K_L^0\pi^+\pi^+\pi^+\pi^-\pi^-K^-\gamma^I$	1187	274	216	490	51669
63	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$	702	489	—	489	52158
64	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+\gamma^I$	158	216	266	482	52640
65	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-K^+\gamma^I$	178	216	264	480	53120
66	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+\gamma^I$	18	478	—	478	53598

rowNo	decay initial-final states	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
67	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	85	226	245	471	54069
68	$e^+e^- \rightarrow \pi^0\pi^0\pi^0K_L^0\pi^+\pi^+\pi^-\pi^-K^-$	154	251	218	469	54538
69	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-$	624	464	—	464	55002
70	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I\gamma^I$	404	455	—	455	55457
71	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-K^+K^-$	1154	455	—	455	55912
72	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+\gamma^I$	335	224	219	443	56355
73	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-$	498	438	—	438	56793
74	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	105	432	—	432	57225
75	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	218	428	—	428	57653
76	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^-\gamma^I$	1393	215	205	420	58073
77	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I\gamma^I$	414	416	—	416	58489
78	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\gamma^I$	316	413	—	413	58902
79	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-\gamma^I\gamma^I$	298	410	—	410	59312
80	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	599	410	—	410	59722
81	$e^+e^- \rightarrow \pi^0\pi^0\pi^0K_L^0\pi^+\pi^+\pi^-\pi^-K^-\gamma^I$	70	213	193	406	60128
82	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-\gamma^I$	118	406	—	406	60534
83	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-$	37	399	—	399	60933
84	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	760	200	198	398	61331
85	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	104	396	—	396	61727
86	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	525	185	204	389	62116
87	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-K^+$	1142	191	195	386	62502
88	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	36	381	—	381	62883
89	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	262	162	214	376	63259
90	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+$	308	176	196	372	63631
91	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\gamma^I$	581	369	—	369	64000
92	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$	1244	364	—	364	64364
93	$e^+e^- \rightarrow \pi^0K_L^0\pi^+\pi^+\pi^+\pi^-\pi^-K^-$	7	198	164	362	64726
94	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	368	362	—	362	65088
95	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-\gamma^I$	503	359	—	359	65447
96	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\pi^-K^+\gamma^I$	15	183	175	358	65805
97	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I\gamma^I$	238	356	—	356	66161
98	$e^+e^- \rightarrow \pi^0K_L^0\pi^+\pi^+\pi^+\pi^-\pi^-K^-\gamma^I$	632	180	173	353	66514
99	$e^+e^- \rightarrow \pi^0K_L^0\pi^+\pi^+\pi^+\pi^-\pi^-K^-$	321	179	173	352	66866
100	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\pi^-K^+K^-\gamma^I$	737	342	—	342	67208

rowNo	decay initial-final states	iDcyIFsts	nEtr	nCcEtr	nAllEtr	nCEtr
rest	$e^+e^- \rightarrow$ others (18078 in total)	—	—	—	149588	216796

Table 3: Decay branches of  $D_s^+$ .

rowNo	decay branch of $D_s^+$	iDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D_s^+ \rightarrow \bar{K}^0 K^{*+}$	3	3	3	6	6
2	$D_s^+ \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \pi^-$	0	3	0	3	9
3	$D_s^+ \rightarrow \pi^+ \phi$	8	2	1	3	12
4	$D_s^+ \rightarrow \pi^+ \eta'$	9	1	2	3	15
5	$D_s^+ \rightarrow \tau^+ \nu_\tau$	11	1	2	3	18
6	$D_s^+ \rightarrow \pi^+ K^+ K^-$	13	1	2	3	21
7	$D_s^+ \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \eta$	10	0	2	2	23
8	$D_s^+ \rightarrow \rho^+ \eta'$	1	2	0	2	25
9	$D_s^+ \rightarrow \rho^+ \phi$	12	2	0	2	27
10	$D_s^+ \rightarrow K_S^0 K^+$	6	2	0	2	29
11	$D_s^+ \rightarrow \bar{K}^* K^{*+}$	18	1	1	2	31
12	$D_s^+ \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^- \eta$	7	0	1	1	32
13	$D_s^+ \rightarrow \pi^0 \pi^+ \omega$	4	1	0	1	33
14	$D_s^+ \rightarrow e^+ \nu_e \eta$	5	1	0	1	34
15	$D_s^+ \rightarrow \mu^+ \nu_\mu \eta$	14	0	1	1	35
16	$D_s^+ \rightarrow \pi^+ \pi^+ \pi^-$	15	1	0	1	36
17	$D_s^+ \rightarrow \pi^0 \pi^0 \pi^+ \eta$	16	0	1	1	37
18	$D_s^+ \rightarrow \rho^+ \eta$	17	0	1	1	38
19	$D_s^+ \rightarrow e^+ \nu_e \eta'$	2	1	0	1	39
20	$D_s^+ \rightarrow \pi^+ \pi^+ \pi^- \omega$	19	0	1	1	40
21	$D_s^+ \rightarrow \pi^+ \eta \omega$	20	0	1	1	41
22	$D_s^+ \rightarrow \pi^+ \pi^- K_S^0 K^+$	21	0	1	1	42
23	$D_s^+ \rightarrow \pi^+ \pi^- K^+$	22	1	0	1	43

Table 4: Decay branches of  $D^{*+}$ .

rowNo	decay branch of $D^{*+}$	iDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D^{*+} \rightarrow \pi^+ D^0$	0	46	44	90	90
2	$D^{*+} \rightarrow \pi^0 D^+$	1	13	7	20	110
3	$D^{*+} \rightarrow D^+ \gamma$	2	0	1	1	111

Table 5: Decay branches of  $D^{*0}$ .

rowNo	decay branch of $D^{*0}$	iDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D^{*0} \rightarrow \pi^0 D^0$	0	39	42	81	81
2	$D^{*0} \rightarrow D^0 \gamma$	1	22	21	43	124

Table 6: Decay branches of  $D^0$ .

rowNo	decay branch of $D^0$	iDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D^0 \rightarrow \pi^+ K^-$	0	95	79	174	174
2	$D^0 \rightarrow \pi^0 \pi^+ K^-$	9	17	18	35	209
3	$D^0 \rightarrow K^- a_1^+$	12	8	10	18	227
4	$D^0 \rightarrow e^+ \nu_e K^-$	4	6	10	16	243
5	$D^0 \rightarrow \mu^+ \nu_\mu K^-$	3	6	5	11	254
6	$D^0 \rightarrow \rho^+ K^{*-}$	16	7	4	11	265
7	$D^0 \rightarrow e^+ \nu_e K^{*-}$	11	3	5	8	273
8	$D^0 \rightarrow \pi^+ \pi^- \bar{K}^*$	1	2	4	6	279
9	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ K^-$	2	3	3	6	285
10	$D^0 \rightarrow K_L^0 \pi^+ \pi^-$	29	4	2	6	291
11	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^-$	42	3	2	5	296
12	$D^0 \rightarrow \pi^0 \pi^0 K_L^0$	13	2	2	4	300
13	$D^0 \rightarrow \pi^0 \pi^+ \pi^-$	21	1	3	4	304
14	$D^0 \rightarrow K_S^0 \eta'$	14	1	3	4	308
15	$D^0 \rightarrow \pi^0 \pi^0 K_L^0$	38	3	1	4	312
16	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^+ \pi^- K_S^0$	15	2	2	4	316
17	$D^0 \rightarrow \pi^- K^+$	28	2	1	3	319
18	$D^0 \rightarrow \pi^+ \pi^- K_S^0$	20	1	2	3	322
19	$D^0 \rightarrow \omega K_S^0$	7	0	3	3	325
20	$D^0 \rightarrow \pi^0 \pi^+ \pi^- \bar{K}^*$	25	1	2	3	328
21	$D^0 \rightarrow \pi^0 \pi^0 \bar{K}^*$	23	0	2	2	330
22	$D^0 \rightarrow \pi^+ \omega K^-$	17	0	2	2	332
23	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^- K_S^0$	26	1	1	2	334
24	$D^0 \rightarrow \mu^+ \nu_\mu K^{*-}$	18	2	0	2	336
25	$D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^-$	5	1	1	2	338
26	$D^0 \rightarrow \pi^0 K^+ K^-$	33	1	1	2	340
27	$D^0 \rightarrow \pi^0 K_S^0$	34	0	2	2	342
28	$D^0 \rightarrow \pi^+ \pi^-$	35	1	1	2	344
29	$D^0 \rightarrow K_L^0 \eta'$	6	0	2	2	346
30	$D^0 \rightarrow \pi^0 \pi^0 K_L^0 \pi^+ \pi^-$	22	0	2	2	348
31	$D^0 \rightarrow \pi^0 \pi^+ \pi^- K_S^0$	43	1	1	2	350
32	$D^0 \rightarrow \pi^+ K_1^-$	44	2	0	2	352
33	$D^0 \rightarrow K_L^0 \omega$	45	2	0	2	354

rowNo	decay branch of $D^0$	iDcyBrP	nCase	nCcCase	nAllCase	nCCase
34	$D^0 \rightarrow \omega \bar{K}^*$	10	0	1	1	355
35	$D^0 \rightarrow K_S^0 K^+ K^-$	19	0	1	1	356
36	$D^0 \rightarrow \pi^+ K^- \eta'$	27	0	1	1	357
37	$D^0 \rightarrow K^+ K^-$	36	0	1	1	358
38	$D^0 \rightarrow \pi^+ \pi^- K^+ K^-$	37	1	0	1	359
39	$D^0 \rightarrow \pi^0 \eta K_S^0$	8	0	1	1	360
40	$D^0 \rightarrow \pi^0 \eta$	39	1	0	1	361
41	$D^0 \rightarrow \eta \eta'$	40	1	0	1	362
42	$D^0 \rightarrow K^- K^{*+}$	41	0	1	1	363
43	$D^0 \rightarrow \pi^0 K_L^0$	24	0	1	1	364
44	$D^0 \rightarrow \pi^0 \bar{K}_1^0$	30	1	0	1	365
45	$D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^- K_S^0$	31	1	0	1	366
46	$D^0 \rightarrow \pi^+ \eta K^-$	32	0	1	1	367
47	$D^0 \rightarrow \rho^0 \rho^0$	46	0	1	1	368
48	$D^0 \rightarrow \pi^0 \rho^+ K^-$	47	0	1	1	369
49	$D^0 \rightarrow \pi^0 \bar{K}^*$	48	0	1	1	370
50	$D^0 \rightarrow e^+ \nu_e \pi^-$	49	0	1	1	371
51	$D^0 \rightarrow \pi^0 \pi^+ K^{*-}$	50	1	0	1	372
52	$D^0 \rightarrow \pi^+ \pi^+ \pi^+ \pi^- \pi^- K^-$	51	0	1	1	373
53	$D^0 \rightarrow \pi^+ \pi^+ \pi^- K^-$	52	1	0	1	374
54	$D^0 \rightarrow \pi^0 \pi^0 \pi^0$	53	1	0	1	375
55	$D^0 \rightarrow K_L^0 \phi$	54	0	1	1	376
56	$D^0 \rightarrow e^+ \nu_e \rho^-$	55	0	1	1	377
57	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 K_L^0 \pi^+ \pi^-$	56	1	0	1	378

Table 7: Decay branches of  $\pi^0$ .

rowNo	decay branch of $\pi^0$	iDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$\pi^0 \rightarrow e^+ e^-$	0	30051	—	30051	30051
2	$\pi^0 \rightarrow e^+ e^+ e^- e^-$	1	161	—	161	30212

Table 8: Cascade decay branches of  $D_s^+$ .

rowNo	cascade decay branch of $D_s^+$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D_s^+ \rightarrow \pi^0 \pi^+ \pi^+ \pi^+ \pi^- \pi^-$	0	3	0	3	3
2	$D_s^+ \rightarrow \pi^+ K^+ K^-$	18	1	2	3	6
3	$D_s^+ \rightarrow \rho^+ \phi, \rho^+ \rightarrow \pi^0 \pi^+, \phi \rightarrow K^+ K^-$	16	2	0	2	8
4	$D_s^+ \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \eta, \eta \rightarrow \gamma\gamma$	14	0	2	2	10
5	$D_s^+ \rightarrow \pi^0 \pi^+ \omega, \omega \rightarrow \pi^0 \pi^+ \pi^-$	4	1	0	1	11
6	$D_s^+ \rightarrow \bar{K}^0 K^{*+}, \bar{K}^0 \rightarrow K_S^0, K^{*+} \rightarrow \pi^0 K^+, K_S^0 \rightarrow \pi^+ \pi^-$	5	1	0	1	12
7	$D_s^+ \rightarrow e^+ \nu_e \eta, \eta \rightarrow \pi^0 \pi^0 \pi^0$	6	1	0	1	13
8	$D_s^+ \rightarrow \bar{K}^0 K^{*+}, \bar{K}^0 \rightarrow K_S^0, K^{*+} \rightarrow \pi^+ K^0, K_S^0 \rightarrow \pi^0 \pi^0, K^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	7	0	1	1	14
9	$D_s^+ \rightarrow \bar{K}^0 K^{*+}, \bar{K}^0 \rightarrow K_L^0, K^{*+} \rightarrow \pi^+ K^0, K^0 \rightarrow K_L^0$	8	1	0	1	15
10	$D_s^+ \rightarrow \rho^+ \eta', \rho^+ \rightarrow \pi^0 \pi^+, \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \pi^0 \pi^+ \pi^-$	9	1	0	1	16
11	$D_s^+ \rightarrow K_S^0 K^+, K_S^0 \rightarrow \pi^0 \pi^0$	10	1	0	1	17
12	$D_s^+ \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \eta, \eta \rightarrow \pi^0 \pi^0 \pi^0$	11	0	1	1	18
13	$D_s^+ \rightarrow \pi^+ \phi, \phi \rightarrow K_L^0 K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	12	1	0	1	19
14	$D_s^+ \rightarrow \pi^+ \eta', \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \gamma\gamma$	13	0	1	1	20
15	$D_s^+ \rightarrow \rho^+ \eta', \rho^+ \rightarrow \pi^0 \pi^+, \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \gamma\gamma$	1	1	0	1	21
16	$D_s^+ \rightarrow \tau^+ \nu_\tau, \tau^+ \rightarrow \bar{\nu}_\tau \pi^0 \pi^+ \pi^-$	15	0	1	1	22
17	$D_s^+ \rightarrow e^+ \nu_e \eta', \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	2	1	0	1	23
18	$D_s^+ \rightarrow \pi^+ \phi, \phi \rightarrow K_L^0 K_S^0$	17	1	0	1	24
19	$D_s^+ \rightarrow \bar{K}^0 K^{*+}, \bar{K}^0 \rightarrow K_L^0, K^{*+} \rightarrow \pi^0 K^+$	3	0	1	1	25
20	$D_s^+ \rightarrow \bar{K}^0 K^{*+}, \bar{K}^0 \rightarrow K_S^0, K^{*+} \rightarrow \pi^+ K^0, K_S^0 \rightarrow \pi^+ \pi^-, K^0 \rightarrow K_L^0, K_L^0 \rightarrow \gamma\gamma$	19	1	0	1	26
21	$D_s^+ \rightarrow \mu^+ \nu_\mu \eta, \eta \rightarrow \pi^0 \pi^0 \pi^0$	20	0	1	1	27
22	$D_s^+ \rightarrow \pi^+ \pi^+ \pi^-$	21	1	0	1	28
23	$D_s^+ \rightarrow \pi^+ \eta', \eta' \rightarrow \pi^0 \pi^0 \eta, \eta \rightarrow \gamma\gamma$	22	1	0	1	29
24	$D_s^+ \rightarrow \pi^0 \pi^0 \pi^+ \eta, \eta \rightarrow \gamma\gamma$	23	0	1	1	30
25	$D_s^+ \rightarrow \rho^+ \eta, \rho^+ \rightarrow \pi^0 \pi^+, \eta \rightarrow \gamma\gamma$	24	0	1	1	31
26	$D_s^+ \rightarrow \bar{K}^* K^{*+}, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, K^{*+} \rightarrow \pi^+ K^0, \bar{K}^0 \rightarrow K_S^0, K^0 \rightarrow K_L^0, K_S^0 \rightarrow \pi^+ \pi^-$	25	1	0	1	32
27	$D_s^+ \rightarrow \bar{K}^0 K^{*+}, \bar{K}^0 \rightarrow K_S^0, K^{*+} \rightarrow \pi^+ K^0, K_S^0 \rightarrow \pi^+ \pi^-, K^0 \rightarrow K_L^0$	26	0	1	1	33
28	$D_s^+ \rightarrow \tau^+ \nu_\tau, \tau^+ \rightarrow \mu^+ \nu_\mu \bar{\nu}_\tau$	27	0	1	1	34
29	$D_s^+ \rightarrow \pi^+ \phi, \phi \rightarrow K_L^0 K_S^0, K_L^0 \rightarrow e^+ \bar{\nu}_e \pi^-, K_S^0 \rightarrow \pi^0 \pi^0$	28	0	1	1	35

rowNo	cascade decay branch of $D_s^+$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
30	$D_s^+ \rightarrow \bar{K}^* K^{*+}, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, K^{*+} \rightarrow \pi^0 K^+, \bar{K}^0 \rightarrow K_L^0$	29	0	1	1	36
31	$D_s^+ \rightarrow \pi^+ \pi^+ \pi^- \omega, \omega \rightarrow \pi^0 \pi^+ \pi^-$	30	0	1	1	37
32	$D_s^+ \rightarrow \pi^+ \eta \omega, \eta \rightarrow \pi^0 \pi^0 \pi^0, \omega \rightarrow \pi^0 \pi^+ \pi^-$	31	0	1	1	38
33	$D_s^+ \rightarrow \pi^+ \pi^- K_S^0 K^+, K_S^0 \rightarrow \pi^0 \pi^0$	32	0	1	1	39
34	$D_s^+ \rightarrow K_S^0 K^+, K_S^0 \rightarrow \pi^+ \pi^-$	33	1	0	1	40
35	$D_s^+ \rightarrow \tau^+ \nu_\tau, \tau^+ \rightarrow \bar{\nu}_\tau \pi^0 \pi^+$	34	1	0	1	41
36	$D_s^+ \rightarrow \pi^+ \pi^- K^+$	35	1	0	1	42
37	$D_s^+ \rightarrow \pi^+ \eta', \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	36	0	1	1	43

Table 9: Cascade decay branches of  $D^{*+}$ .

rowNo	cascade decay branch of $D^{*+}$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^+ K^-$	0	19	19	38	38
2	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^+ K^-$	5	3	5	8	46
3	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \mu^+ \nu_\mu K^-$	2	2	1	3	49
4	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^0 \pi^+ K^-$	1	1	2	3	52
5	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^-$	40	2	1	3	55
6	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K_L^0 \pi^+ \pi^-$	17	0	2	2	57
7	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^0 K^-$	19	1	1	2	59
8	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow e^+ \nu_e \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	25	1	1	2	61
9	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^0 \pi^+ K^+ K^-$	26	2	0	2	63
10	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow e^+ \nu_e K^-$	27	0	2	2	65
11	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^+ \pi^+ K^-$	31	1	1	2	67
12	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^0 \rho^+, \rho^+ \rightarrow \pi^0 \pi^+$	35	2	0	2	69
13	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^+ \pi^+ \pi^- \eta, \eta \rightarrow \gamma\gamma$	7	1	1	2	71
14	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \rho^0 \pi^+, \rho^0 \rightarrow \pi^+ \pi^-$	13	0	1	1	72
15	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^0 \pi^+ K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	14	0	1	1	73
16	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 K_L^0$	15	0	1	1	74
17	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	16	0	1	1	75
18	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^-$	3	1	0	1	76
19	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow e^+ \nu_e \bar{K}^*, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	18	1	0	1	77
20	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow K_L^0 \pi^+ \pi^- K^+$	6	0	1	1	78
21	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow K_S^0 a_1^+, K_S^0 \rightarrow \pi^0 \pi^0, a_1^+ \rightarrow \rho^0 \pi^+, \rho^0 \rightarrow \pi^+ \pi^-$	20	1	0	1	79
22	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \eta, \eta \rightarrow \pi^0 \pi^0 \pi^0, \pi^0 \rightarrow e^+ e^-$	21	1	0	1	80
23	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^- K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	22	1	0	1	81
24	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 K^+ K^-$	23	1	0	1	82
25	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K^+ K^-$	24	0	1	1	83
26	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \eta K_S^0, \eta \rightarrow \gamma\gamma, K_S^0 \rightarrow \pi^+ \pi^-$	4	0	1	1	84
27	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^0 \pi^0 K_L^0, \pi^0 \rightarrow e^+ e^-$	8	1	0	1	85
28	$D^{*+} \rightarrow \pi^0 D^+, \pi^0 \rightarrow e^+ e^-, D^+ \rightarrow \pi^+ \pi^+ K^-$	9	0	1	1	86
29	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow K_S^0 a_1^+, K_S^0 \rightarrow \pi^+ \pi^-, a_1^+ \rightarrow \pi^0 \rho^+, \rho^+ \rightarrow \pi^0 \pi^+$	28	0	1	1	87
30	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^0 \pi^+ \omega, \omega \rightarrow \pi^0 \pi^+ \pi^-$	29	1	0	1	88

rowNo	cascade decay branch of $D^{*+}$	iCascDeyBrP	nCase	nCcCase	nAllCase	nCCase
31	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	30	0	1	1	89
32	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^- K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	10	0	1	1	90
33	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \eta, \eta \rightarrow \gamma\gamma$	32	1	0	1	91
34	$D^{*+} \rightarrow D^+ \gamma, D^+ \rightarrow \pi^+ \pi^+ K^-$	33	0	1	1	92
35	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^0 K_L^0$	34	1	0	1	93
36	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^0 \pi^0 K_L^0$	11	1	0	1	94
37	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^+ K_1^-, K_1^- \rightarrow \rho^- \bar{K}^0, \rho^- \rightarrow \pi^0 \pi^-, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	36	1	0	1	95
38	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K_L^0 \pi^+ \pi^-, K_L^0 \rightarrow e^- \nu_e \pi^+$	37	1	0	1	96
39	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \pi^0 \rightarrow e^+ e^-, \bar{K}^0 \rightarrow K_L^0$	38	1	0	1	97
40	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^- K^+$	39	1	0	1	98
41	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K_S^0 K^+ K^-, K_S^0 \rightarrow \pi^+ \pi^-$	12	0	1	1	99
42	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_L^0$	41	1	0	1	100
43	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K_L^0 \omega, \omega \rightarrow \pi^0 \pi^+ \pi^-$	42	1	0	1	101
44	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \mu^+ \nu_\mu \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	43	1	0	1	102
45	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^0 \pi^+ \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	44	1	0	1	103
46	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^+ f_0(600), f_0(600) \rightarrow \pi^+ \pi^-$	45	1	0	1	104
47	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	46	0	1	1	105
48	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^+ \pi^+ \pi^- \eta, \eta \rightarrow e^+ e^-$	47	1	0	1	106
49	$D^{*+} \rightarrow \pi^0 D^+, D^+ \rightarrow \pi^0 \pi^0 \pi^+$	48	1	0	1	107
50	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^+ \pi^-$	49	0	1	1	108
51	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	50	1	0	1	109
52	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^0 K_L^0 \pi^+ \pi^-$	51	0	1	1	110
53	$D^{*+} \rightarrow \pi^+ D^0, D^0 \rightarrow \pi^0 \pi^+ K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	52	1	0	1	111

Table 10: Cascade decay branches of  $D^{*0}$ .

rowNo	cascade decay branch of $D^{*0}$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^+ K^-$	0	20	19	39	39
2	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^+ K^-$	2	13	10	23	62
3	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^0 \pi^+ K^-$	4	6	1	7	69
4	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow e^+ \nu_e K^-$	22	2	3	5	74
5	$D^{*0} \rightarrow \pi^0 D^0, \pi^0 \rightarrow e^+ e^-, D^0 \rightarrow \pi^0 \pi^+ K^-$	18	1	2	3	77
6	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^0 \pi^+ K^-$	11	1	1	2	79
7	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_L^0$	7	0	2	2	81
8	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^0 \pi^0 \pi^+ K^-$	10	1	1	2	83
9	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^0 \rho^+, \rho^+ \rightarrow \pi^0 \pi^+$	29	1	1	2	85
10	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow K_L^0 \pi^+ \pi^-$	31	2	0	2	87
11	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \mu^+ \nu_\mu K^-$	32	1	1	2	89
12	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^0 K^-$	5	0	1	1	90
13	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	12	0	1	1	91
14	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^+ K^- \eta', \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	13	0	1	1	92
15	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^- K^+$	14	0	1	1	93
16	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^0 \bar{K}_1^0, \bar{K}_1^0 \rightarrow \rho^+ K^-, \rho^+ \rightarrow \pi^0 \pi^+$	15	1	0	1	94
17	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \rho^0 \pi^+, \rho^0 \rightarrow \pi^+ \pi^-$	16	0	1	1	95
18	$D^{*0} \rightarrow \pi^0 D^0, \pi^0 \rightarrow e^+ e^-, D^0 \rightarrow \pi^0 K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	17	0	1	1	96
19	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^0 K^-$	6	1	0	1	97
20	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	19	0	1	1	98
21	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^0 \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	20	0	1	1	99
22	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	21	0	1	1	100
23	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	3	1	0	1	101
24	$D^{*0} \rightarrow \pi^0 D^0, \pi^0 \rightarrow e^+ e^-, D^0 \rightarrow \pi^- K^+$	23	1	0	1	102
25	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^0 \pi^0 \bar{K}^*, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	24	0	1	1	103
26	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \mu^+ \nu_\mu K^-$	25	1	0	1	104
27	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \pi^0 \rightarrow e^+ e^-, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	26	0	1	1	105
28	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow K_S^0 \eta', K_S^0 \rightarrow \pi^+ \pi^-, \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	27	0	1	1	106

rowNo	cascade decay branch of $D^{*0}$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
29	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	28	0	1	1	107
30	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow K_S^0 \eta', K_S^0 \rightarrow \pi^+ \pi^-, \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \pi^0 \pi^0 \pi^0$	8	1	0	1	108
31	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \rho^0 \rho^0, \rho^0 \rightarrow \pi^+ \pi^-, \rho^0 \rightarrow \pi^+ \pi^-$	30	0	1	1	109
32	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \mu^+ \nu_\mu K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	9	1	0	1	110
33	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow K_L^0 \eta', \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \pi^0 \pi^+ \pi^-$	1	0	1	1	111
34	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow K_L^0 \eta', \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	33	0	1	1	112
35	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^+ \pi^+ \pi^-$	34	1	0	1	113
36	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^0 K^+ K^-$	35	0	1	1	114
37	$D^{*0} \rightarrow \pi^0 D^0, \pi^0 \rightarrow e^+ e^-, D^0 \rightarrow \pi^+ K^-$	36	1	0	1	115
38	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow e^+ \nu_e \pi^-$	37	0	1	1	116
39	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^0 \pi^0 K_L^0$	38	1	0	1	117
40	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^+ \pi^+ \pi^+ \pi^- \pi^- K^-$	39	0	1	1	118
41	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \pi^+ \pi^+ \pi^- K^-$	40	1	0	1	119
42	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow \pi^0 \pi^0 \pi^0$	41	1	0	1	120
43	$D^{*0} \rightarrow D^0 \gamma, D^0 \rightarrow K_L^0 \phi, \phi \rightarrow \pi^0 \rho^0, \rho^0 \rightarrow \pi^+ \pi^-$	42	0	1	1	121
44	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow e^+ \nu_e \rho^-, \rho^- \rightarrow \pi^0 \pi^-, \pi^0 \rightarrow e^+ e^-$	43	0	1	1	122
45	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow K_L^0 \pi^+ \pi^-$	44	1	0	1	123
46	$D^{*0} \rightarrow \pi^0 D^0, D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^0 K^-$	45	0	1	1	124

Table 11: Cascade decay branches of  $D^0$ .

rowNo	cascade decay branch of $D^0$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$D^0 \rightarrow \pi^+ K^-$	0	95	79	174	174
2	$D^0 \rightarrow \pi^0 \pi^+ K^-$	9	16	16	32	206
3	$D^0 \rightarrow e^+ \nu_e K^-$	4	6	10	16	222
4	$D^0 \rightarrow \mu^+ \nu_\mu K^-$	3	6	5	11	233
5	$D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^0 \rho^+, \rho^+ \rightarrow \pi^0 \pi^+$	29	4	3	7	240
6	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ K^-$	2	3	3	6	246
7	$D^0 \rightarrow K_L^0 \pi^+ \pi^-$	40	3	2	5	251
8	$D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	17	4	0	4	255
9	$D^0 \rightarrow \pi^0 \pi^+ \pi^-$	27	1	3	4	259
10	$D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^+ \pi^+ \pi^-$	12	1	3	4	263
11	$D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^0 K^-$	15	2	2	4	267
12	$D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^+ f_0(600), f_0(600) \rightarrow \pi^+ \pi^-$	45	2	2	4	271
13	$D^0 \rightarrow \pi^0 \pi^0 K_L^0$	51	3	1	4	275
14	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^-$	62	2	2	4	279
15	$D^0 \rightarrow \pi^- K^+$	38	2	1	3	282
16	$D^0 \rightarrow \pi^0 \pi^+ K^-, \pi^0 \rightarrow e^+ e^-$	39	1	2	3	285
17	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 K_L^0$	23	1	2	3	288
18	$D^0 \rightarrow \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	1	0	3	3	291
19	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	22	1	2	3	294
20	$D^0 \rightarrow \pi^0 \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	35	1	2	3	297
21	$D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	10	1	1	2	299
22	$D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	31	0	2	2	301
23	$D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \rho^0 \pi^+, \rho^0 \rightarrow \pi^+ \pi^-$	32	0	2	2	303
24	$D^0 \rightarrow e^+ \nu_e K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_L^0$	18	0	2	2	305
25	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	36	1	1	2	307
26	$D^0 \rightarrow \omega K_S^0, \omega \rightarrow \pi^0 \pi^+ \pi^-, K_S^0 \rightarrow \pi^+ \pi^-$	7	0	2	2	309
27	$D^0 \rightarrow K_S^0 \eta', K_S^0 \rightarrow \pi^+ \pi^-, \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \gamma\gamma$	14	0	2	2	311
28	$D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_L^0$	24	2	0	2	313
29	$D^0 \rightarrow \pi^0 K^+ K^-$	44	1	1	2	315
30	$D^0 \rightarrow \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	26	1	1	2	317
31	$D^0 \rightarrow \pi^0 K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	46	0	2	2	319

rowNo	cascade decay branch of $D^0$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
32	$D^0 \rightarrow \pi^+ \pi^-$	47	1	1	2	321
33	$D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^-$	5	1	1	2	323
34	$D^0 \rightarrow \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_L^0$	60	2	0	2	325
35	$D^0 \rightarrow \pi^0 \pi^0 K_L^0 \pi^+ \pi^-$	28	0	2	2	327
36	$D^0 \rightarrow K_L^0 \omega, \omega \rightarrow \pi^0 \pi^+ \pi^-$	68	2	0	2	329
37	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	16	1	0	1	330
38	$D^0 \rightarrow \pi^+ K^- \eta', \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	37	0	1	1	331
39	$D^0 \rightarrow K_S^0 K^+ K^-, K_S^0 \rightarrow \pi^+ \pi^-$	25	0	1	1	332
40	$D^0 \rightarrow K_L^0 \eta', \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \pi^0 \pi^+ \pi^-$	6	0	1	1	333
41	$D^0 \rightarrow \pi^0 \pi^0 K_L^0, \pi^0 \rightarrow e^+ e^-$	13	1	0	1	334
42	$D^0 \rightarrow \pi^0 \bar{K}_1^0, \bar{K}_1^0 \rightarrow \rho^+ K^-, \rho^+ \rightarrow \pi^0 \pi^+$	41	1	0	1	335
43	$D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^- K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	42	1	0	1	336
44	$D^0 \rightarrow \pi^+ \eta K^-, \eta \rightarrow \pi^0 \pi^0 \pi^0$	43	0	1	1	337
45	$D^0 \rightarrow K_S^0 \eta', K_S^0 \rightarrow \pi^+ \pi^-, \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \pi^0 \pi^0 \pi^0$	19	1	0	1	338
46	$D^0 \rightarrow \pi^+ \omega K^-, \omega \rightarrow \pi^0 \gamma$	20	0	1	1	339
47	$D^0 \rightarrow \pi^0 \pi^0 \bar{K}^*, \pi^0 \rightarrow e^+ e^-, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	30	0	1	1	340
48	$D^0 \rightarrow \mu^+ \nu_\mu K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	21	1	0	1	341
49	$D^0 \rightarrow K^+ K^-$	48	0	1	1	342
50	$D^0 \rightarrow \pi^+ \pi^- K^+ K^-$	49	1	0	1	343
51	$D^0 \rightarrow \pi^+ \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	50	0	1	1	344
52	$D^0 \rightarrow \pi^0 \eta K_S^0, \eta \rightarrow \gamma\gamma, K_S^0 \rightarrow \pi^+ \pi^-$	8	0	1	1	345
53	$D^0 \rightarrow \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	52	0	1	1	346
54	$D^0 \rightarrow \pi^0 \eta, \eta \rightarrow \gamma\gamma$	53	1	0	1	347
55	$D^0 \rightarrow \eta\eta', \eta \rightarrow \pi^0 \pi^0 \pi^0, \eta' \rightarrow \pi^+ \pi^- \eta, \eta \rightarrow \gamma\gamma$	54	1	0	1	348
56	$D^0 \rightarrow \mu^+ \nu_\mu K^{*-}, K^{*-} \rightarrow \pi^0 K^-$	55	1	0	1	349
57	$D^0 \rightarrow \pi^0 \pi^0 \bar{K}^*, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	56	0	1	1	350
58	$D^0 \rightarrow K^- a_1^+, a_1^+ \rightarrow \pi^0 \rho^+, \pi^0 \rightarrow e^+ e^-, \rho^+ \rightarrow \pi^0 \pi^+$	57	1	0	1	351
59	$D^0 \rightarrow K^- K^{*+}, K^{*+} \rightarrow \pi^0 K^+$	58	0	1	1	352
60	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^-, \pi^0 \rightarrow e^+ e^-$	59	1	0	1	353
61	$D^0 \rightarrow \pi^+ \omega K^-, \omega \rightarrow \pi^0 \pi^+ \pi^-, \pi^0 \rightarrow e^+ e^-$	33	0	1	1	354
62	$D^0 \rightarrow \pi^0 \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	61	0	1	1	355
63	$D^0 \rightarrow \pi^0 K_L^0$	34	0	1	1	356
64	$D^0 \rightarrow \pi^+ K_1^-, K_1^- \rightarrow \rho^- \bar{K}^0, \rho^- \rightarrow \pi^0 \pi^-, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	63	1	0	1	357

rowNo	cascade decay branch of $D^0$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
65	$D^0 \rightarrow K_L^0 \pi^+ \pi^-, K_L^0 \rightarrow e^- \nu_e \pi^+$	64	1	0	1	358
66	$D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \pi^0 \rightarrow e^+ e^-, \bar{K}^0 \rightarrow K_L^0$	65	1	0	1	359
67	$D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^- \bar{K}^0, \pi^0 \rightarrow e^+ e^-, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^0 \pi^0$	66	0	1	1	360
68	$D^0 \rightarrow K_S^0 \eta', K_S^0 \rightarrow \pi^+ \pi^-, \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	67	0	1	1	361
69	$D^0 \rightarrow \omega \bar{K}^*, \omega \rightarrow \pi^0 \gamma, \bar{K}^* \rightarrow \pi^+ K^-$	11	0	1	1	362
70	$D^0 \rightarrow \omega K_S^0, \omega \rightarrow \pi^0 \pi^+ \pi^-, K_S^0 \rightarrow \pi^0 \pi^0$	69	0	1	1	363
71	$D^0 \rightarrow \rho^0 \rho^0, \rho^0 \rightarrow \pi^+ \pi^-, \rho^0 \rightarrow \pi^+ \pi^-$	70	0	1	1	364
72	$D^0 \rightarrow K_L^0 \eta', \eta' \rightarrow \rho^0 \gamma, \rho^0 \rightarrow \pi^+ \pi^-$	71	0	1	1	365
73	$D^0 \rightarrow \pi^0 \rho^+ K^-, \rho^+ \rightarrow \pi^0 \pi^+$	72	0	1	1	366
74	$D^0 \rightarrow \pi^0 \bar{K}^*, \bar{K}^* \rightarrow \pi^0 \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	73	0	1	1	367
75	$D^0 \rightarrow e^+ \nu_e \pi^-$	74	0	1	1	368
76	$D^0 \rightarrow \pi^0 \pi^+ \pi^- K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	75	1	0	1	369
77	$D^0 \rightarrow \pi^0 \pi^+ K^{*-}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	76	1	0	1	370
78	$D^0 \rightarrow \pi^+ K_1^-, K_1^- \rightarrow \pi^- \bar{K}^*, \bar{K}^* \rightarrow \pi^+ K^-$	77	1	0	1	371
79	$D^0 \rightarrow \pi^+ \pi^+ \pi^+ \pi^- K^-$	78	0	1	1	372
80	$D^0 \rightarrow \pi^+ \pi^+ \pi^- K^-$	79	1	0	1	373
81	$D^0 \rightarrow \pi^0 \pi^0 \pi^0$	80	1	0	1	374
82	$D^0 \rightarrow K_L^0 \phi, \phi \rightarrow \pi^0 \rho^0, \rho^0 \rightarrow \pi^+ \pi^-$	81	0	1	1	375
83	$D^0 \rightarrow e^+ \nu_e \rho^-, \rho^- \rightarrow \pi^0 \pi^-, \pi^0 \rightarrow e^+ e^-$	82	0	1	1	376
84	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 K_L^0 \pi^+ \pi^-$	83	1	0	1	377
85	$D^0 \rightarrow \rho^+ K^{*-}, \rho^+ \rightarrow \pi^0 \pi^+, K^{*-} \rightarrow \pi^0 K^-$	84	0	1	1	378

Table 12: Cascade decay branches of  $\pi^0$ .

rowNo	cascade decay branch of $\pi^0$	iCascDcyBrP	nCase	nCcCase	nAllCase	nCCase
1	$\pi^0 \rightarrow e^+ e^-$	0	30051	—	30051	30051
2	$\pi^0 \rightarrow e^+ e^+ e^- e^-$	1	161	—	161	30212

Table 13: Decay final states of  $D^{*+}$ .

rowNo	decay final state of $D^{*+}$	iDcyFStP	nCase	nCcCase	nAllCase	nCCase
1	$D^{*+} \rightarrow \pi^+ \pi^+ K^-$	0	19	19	38	38
2	$D^{*+} \rightarrow \pi^0 \pi^+ \pi^+ K^-$	5	4	6	10	48
3	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ K^-$	1	4	2	6	54
4	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^-$	13	2	2	4	58
5	$D^{*+} \rightarrow \mu^+ \nu_\mu \pi^+ K^-$	2	2	1	3	61
6	$D^{*+} \rightarrow \pi^+ \pi^+ \pi^+ \pi^- K^-$	12	1	2	3	64
7	$D^{*+} \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \gamma\gamma$	4	1	2	3	67
8	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^0 \pi^+ \pi^+ \pi^-$	18	2	1	3	70
9	$D^{*+} \rightarrow \pi^0 \pi^+ \pi^+ \pi^+ \pi^- \pi^-$	30	3	0	3	73
10	$D^{*+} \rightarrow K_L^0 \pi^+ \pi^+ \pi^-$	15	0	2	2	75
11	$D^{*+} \rightarrow e^+ \nu_e \pi^0 \pi^+ \pi^-$	23	1	1	2	77
12	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^+ K^+ K^-$	24	2	0	2	79
13	$D^{*+} \rightarrow e^+ \nu_e \pi^+ K^-$	25	0	2	2	81
14	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^0 \pi^+$	26	1	1	2	83
15	$D^{*+} \rightarrow e^+ \nu_e \pi^0 \pi^+ K^-$	17	1	1	2	85
16	$D^{*+} \rightarrow \pi^0 K_L^0 \pi^+ \pi^+ \pi^-$	34	2	0	2	87
17	$D^{*+} \rightarrow e^+ \nu_e \pi^0 \pi^0 \pi^+ \pi^-$	16	1	0	1	88
18	$D^{*+} \rightarrow e^+ e^- \pi^+ \pi^+ K^-$	8	0	1	1	89
19	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^0 \pi^+ \pi^+ \pi^- \pi^-$	9	0	1	1	90
20	$D^{*+} \rightarrow e^+ e^- \pi^0 \pi^0 \pi^0 \pi^0 \pi^+ \pi^+ \pi^-$	19	1	0	1	91
21	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^+ \pi^- \pi^-$	20	1	0	1	92
22	$D^{*+} \rightarrow \pi^0 \pi^+ K^+ K^-$	21	1	0	1	93
23	$D^{*+} \rightarrow \pi^+ K^+ K^-$	22	0	1	1	94
24	$D^{*+} \rightarrow \pi^0 \pi^0 \pi^0 K_L^0 \pi^+$	10	1	0	1	95
25	$D^{*+} \rightarrow \pi^+ \pi^+ \pi^- K^+ K^-$	11	0	1	1	96
26	$D^{*+} \rightarrow \pi^+ \pi^+ \pi^+ \pi^- \pi^-$	3	1	0	1	97
27	$D^{*+} \rightarrow \pi^0 K_L^0 \pi^+ \pi^- K^+$	6	0	1	1	98
28	$D^{*+} \rightarrow \pi^0 \pi^+ \gamma\gamma$	27	1	0	1	99
29	$D^{*+} \rightarrow \pi^+ \pi^+ K^- \gamma$	28	0	1	1	100
30	$D^{*+} \rightarrow \pi^0 \pi^0 K_L^0 \pi^+$	29	1	0	1	101
31	$D^{*+} \rightarrow \pi^0 K_L^0 \pi^+$	14	0	1	1	102
32	$D^{*+} \rightarrow e^- \nu_e \pi^+ \pi^+ \pi^+ \pi^-$	31	1	0	1	103
33	$D^{*+} \rightarrow e^+ e^- K_L^0 \pi^+ \pi^+ \pi^-$	32	1	0	1	104

rowNo	decay final state of $D^{*+}$	iDcyFStP	nCase	nCcCase	nAllCase	nCCase
34	$D^{*+} \rightarrow \pi^+ \pi^- K^+$	33	1	0	1	105
35	$D^{*+} \rightarrow e^+ e^- \pi^0 \pi^0 K_L^0 \pi^+$	7	1	0	1	106
36	$D^{*+} \rightarrow \mu^+ \nu_\mu \pi^0 \pi^+ K^-$	35	1	0	1	107
37	$D^{*+} \rightarrow e^+ \nu_e \pi^+ \pi^+ \pi^- \pi^-$	36	0	1	1	108
38	$D^{*+} \rightarrow e^+ e^- \pi^0 \pi^+ \pi^+ \pi^-$	37	1	0	1	109
39	$D^{*+} \rightarrow \pi^0 \pi^+ \pi^+ \pi^-$	38	0	1	1	110
40	$D^{*+} \rightarrow \pi^0 \pi^0 K_L^0 \pi^+ \pi^+ \pi^-$	39	0	1	1	111

Table 14: Decay final states of  $D^{*0}$ .

rowNo	decay final state of $D^{*0}$	iDcyFStP	nCase	nCcCase	nAllCase	nCCase
1	$D^{*0} \rightarrow \pi^0 \pi^+ K^-$	0	20	19	39	39
2	$D^{*0} \rightarrow \pi^+ K^- \gamma$	2	13	10	23	62
3	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^+ K^-$	4	6	1	7	69
4	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^0 \pi^+ K^-$	10	2	3	5	74
5	$D^{*0} \rightarrow e^+ \nu_e \pi^0 K^-$	22	2	3	5	79
6	$D^{*0} \rightarrow e^+ e^- \pi^0 \pi^+ K^-$	18	1	2	3	82
7	$D^{*0} \rightarrow \pi^0 \pi^+ \pi^+ \pi^- K^-$	16	1	1	2	84
8	$D^{*0} \rightarrow e^+ \nu_e \pi^0 K_L^0 \pi^-$	7	0	2	2	86
9	$D^{*0} \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \pi^- \gamma$	19	0	2	2	88
10	$D^{*0} \rightarrow \pi^+ \pi^+ \pi^- K^- \gamma$	21	1	1	2	90
11	$D^{*0} \rightarrow \pi^0 \pi^+ K^- \gamma$	11	1	1	2	92
12	$D^{*0} \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \pi^-$	27	0	2	2	94
13	$D^{*0} \rightarrow K_L^0 \pi^+ \pi^- \gamma$	28	2	0	2	96
14	$D^{*0} \rightarrow \mu^+ \nu_\mu K^- \gamma$	29	1	1	2	98
15	$D^{*0} \rightarrow \pi^- K^+ \gamma$	14	0	1	1	99
16	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^+ K^- \gamma$	15	1	0	1	100
17	$D^{*0} \rightarrow e^+ \nu_e \pi^0 \pi^0 K^-$	6	1	0	1	101
18	$D^{*0} \rightarrow e^+ e^- \pi^0 \pi^0 \pi^0$	17	0	1	1	102
19	$D^{*0} \rightarrow e^+ \nu_e \pi^0 \pi^+ \pi^- \pi^-$	3	1	0	1	103
20	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^0 \pi^0 \pi^+ \pi^- \pi^-$	8	1	0	1	104
21	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^- K^-$	20	0	1	1	105
22	$D^{*0} \rightarrow \mu^+ \nu_\mu \pi^+ \pi^- \pi^- \gamma$	9	1	0	1	106
23	$D^{*0} \rightarrow \pi^0 K_L^0 \pi^+ \pi^+ \pi^- \pi^- \gamma$	1	0	1	1	107
24	$D^{*0} \rightarrow e^+ e^- \pi^- K^+$	23	1	0	1	108
25	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^0 \pi^0 \pi^0$	24	0	1	1	109
26	$D^{*0} \rightarrow \mu^+ \nu_\mu \pi^0 K^-$	25	1	0	1	110
27	$D^{*0} \rightarrow e^+ e^- \pi^0 \pi^0 \pi^+ \pi^- \gamma$	26	0	1	1	111
28	$D^{*0} \rightarrow e^+ \nu_e \pi^0 K^- \gamma$	5	0	1	1	112
29	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^0 \pi^0 \pi^0 \pi^+ \pi^-$	12	0	1	1	113
30	$D^{*0} \rightarrow \pi^0 \pi^+ \pi^+ \pi^- K^- \gamma$	13	0	1	1	114
31	$D^{*0} \rightarrow K_L^0 \pi^+ \pi^- \gamma \gamma$	30	0	1	1	115
32	$D^{*0} \rightarrow \pi^0 \pi^0 K^+ K^-$	31	0	1	1	116
33	$D^{*0} \rightarrow e^+ e^- \pi^+ K^-$	32	1	0	1	117

rowNo	decay final state of $D^{*0}$	iDcyFStP	nCase	nCcCase	nAllCase	nCCase
34	$D^{*0} \rightarrow e^+ \nu_e \pi^0 \pi^-$	33	0	1	1	118
35	$D^{*0} \rightarrow \pi^0 \pi^0 K_L^0 \gamma$	34	1	0	1	119
36	$D^{*0} \rightarrow \pi^+ \pi^+ \pi^+ \pi^- \pi^- K^- \gamma$	35	0	1	1	120
37	$D^{*0} \rightarrow \pi^0 \pi^0 \pi^0 \gamma$	36	1	0	1	121
38	$D^{*0} \rightarrow \pi^0 K_L^0 \pi^+ \pi^- \gamma$	37	0	1	1	122
39	$D^{*0} \rightarrow e^+ e^- \nu_e \pi^0 \pi^-$	38	0	1	1	123
40	$D^{*0} \rightarrow \pi^0 K_L^0 \pi^+ \pi^-$	39	1	0	1	124

Table 15: Decay final states of  $D^0$ .

rowNo	decay final state of $D^0$	iDcyFStP	nCase	nCcCase	nAllCase	nCCase
1	$D^0 \rightarrow \pi^+ K^-$	0	95	79	174	174
2	$D^0 \rightarrow \pi^0 \pi^+ K^-$	9	16	16	32	206
3	$D^0 \rightarrow e^+ \nu_e K^-$	4	6	10	16	222
4	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ K^-$	2	8	8	16	238
5	$D^0 \rightarrow \pi^+ \pi^+ \pi^- K^-$	1	5	10	15	253
6	$D^0 \rightarrow \mu^+ \nu_\mu K^-$	3	6	5	11	264
7	$D^0 \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \pi^-$	7	7	3	10	274
8	$D^0 \rightarrow \pi^0 K_L^0 \pi^+ \pi^-$	20	6	1	7	281
9	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^-$	41	2	4	6	287
10	$D^0 \rightarrow K_L^0 \pi^+ \pi^-$	33	3	2	5	292
11	$D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^-$	5	2	3	5	297
12	$D^0 \rightarrow \pi^0 \pi^+ \pi^-$	22	1	3	4	301
13	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^+ \pi^-$	25	0	4	4	305
14	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^+ \pi^- \pi^-$	17	2	2	4	309
15	$D^0 \rightarrow \pi^0 \pi^0 K_L^0$	40	3	1	4	313
16	$D^0 \rightarrow e^+ \nu_e \pi^0 K^-$	14	2	2	4	317
17	$D^0 \rightarrow e^+ e^- \pi^+ K^-$	32	1	2	3	320
18	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 K_L^0$	19	1	2	3	323
19	$D^0 \rightarrow \pi^0 K^+ K^-$	36	1	2	3	326
20	$D^0 \rightarrow \pi^0 \pi^0 \pi^0$	37	1	2	3	329
21	$D^0 \rightarrow \pi^0 \pi^+ \pi^+ \pi^- K^-$	28	1	2	3	332
22	$D^0 \rightarrow \pi^- K^+$	31	2	1	3	335
23	$D^0 \rightarrow e^+ \nu_e \pi^+ \pi^- \pi^-$	10	1	1	2	337
24	$D^0 \rightarrow \pi^+ \pi^- K^+ K^-$	21	1	1	2	339
25	$D^0 \rightarrow e^+ \nu_e K_L^0 \pi^-$	16	0	2	2	341
26	$D^0 \rightarrow \pi^0 \pi^0 K_L^0 \pi^+ \pi^-$	23	0	2	2	343
27	$D^0 \rightarrow \pi^0 \pi^+ K^- \gamma$	11	0	2	2	345
28	$D^0 \rightarrow \pi^+ \pi^-$	38	1	1	2	347
29	$D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^- \gamma \gamma$	13	0	2	2	349
30	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^0 \pi^+ \pi^-$	29	1	1	2	351
31	$D^0 \rightarrow \pi^+ \pi^+ \pi^- K^- \gamma$	30	0	1	1	352
32	$D^0 \rightarrow \pi^0 \pi^+ \pi^- \gamma \gamma$	8	0	1	1	353
33	$D^0 \rightarrow \mu^+ \nu_\mu \pi^+ \pi^- \pi^-$	18	1	0	1	354

rowNo	decay final state of $D^0$	iDcyFStP	nCase	nCcCase	nAllCase	nCCase
34	$D^0 \rightarrow e^+ e^- \pi^0 \pi^0 \pi^0 \pi^0$	24	0	1	1	355
35	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^- \pi^-$	34	1	0	1	356
36	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^+ K^-$	35	0	1	1	357
37	$D^0 \rightarrow \pi^0 K_L^0 \pi^+ \pi^+ \pi^- \pi^-$	6	0	1	1	358
38	$D^0 \rightarrow e^+ e^- \pi^+ \pi^+ \pi^- K^-$	26	0	1	1	359
39	$D^0 \rightarrow \pi^0 K_L^0$	27	0	1	1	360
40	$D^0 \rightarrow K^+ K^-$	39	0	1	1	361
41	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^0 \pi^+ \pi^-$	15	1	0	1	362
42	$D^0 \rightarrow e^+ e^- \pi^0 \pi^0 K_L^0$	12	1	0	1	363
43	$D^0 \rightarrow \pi^0 \gamma \gamma$	42	1	0	1	364
44	$D^0 \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \gamma \gamma$	43	1	0	1	365
45	$D^0 \rightarrow \mu^+ \nu_\mu \pi^0 K^-$	44	1	0	1	366
46	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 \pi^0 \pi^0$	45	0	1	1	367
47	$D^0 \rightarrow e^+ e^- \pi^0 \pi^+ K^-$	46	1	0	1	368
48	$D^0 \rightarrow e^+ e^- \pi^0 \pi^+ \pi^-$	47	1	0	1	369
49	$D^0 \rightarrow e^- \nu_e \pi^+ \pi^+ \pi^-$	48	1	0	1	370
50	$D^0 \rightarrow e^+ e^- K_L^0 \pi^+ \pi^-$	49	1	0	1	371
51	$D^0 \rightarrow e^+ e^- \pi^0 \pi^0 \pi^+ \pi^-$	50	0	1	1	372
52	$D^0 \rightarrow \pi^+ \pi^+ \pi^- \pi^- \gamma$	51	0	1	1	373
53	$D^0 \rightarrow K_L^0 \pi^+ \pi^- \gamma$	52	0	1	1	374
54	$D^0 \rightarrow e^+ \nu_e \pi^-$	53	0	1	1	375
55	$D^0 \rightarrow \pi^+ \pi^+ \pi^+ \pi^- \pi^- K^-$	54	0	1	1	376
56	$D^0 \rightarrow e^+ e^+ e^- \nu_e \pi^-$	55	0	1	1	377
57	$D^0 \rightarrow \pi^0 \pi^0 \pi^0 K_L^0 \pi^+ \pi^-$	56	1	0	1	378

Table 16: Decay final states of  $\pi^0$ .

rowNo	decay final state of $\pi^0$	iDcyFStP	nCase	nCcCase	nAllCase	nCCase
1	$\pi^0 \rightarrow e^+ e^-$	0	30051	—	30051	30051
2	$\pi^0 \rightarrow e^+ e^+ e^- e^-$	1	161	—	161	30212

Table 17: Production branches of  $D_s^+$ .

rowNo	production branch of $D_s^+$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
1	$D_s^{*+} \rightarrow \textcolor{blue}{D}_s^+ \gamma$	0	10	7	17	17
2	$D_s^{*+} \rightarrow \pi^0 \textcolor{blue}{D}_s^+$	1	2	0	2	19
3	$e^+ e^- \rightarrow \pi^0 \pi^0 K^- \bar{D}^0 \textcolor{blue}{D}_s^+ \gamma^I \gamma^I$	2	1	0	1	20
4	$e^+ e^- \rightarrow \pi^+ \omega K^- D^{*-} \textcolor{blue}{D}_s^+ \gamma^I$	3	1	0	1	21
5	$e^+ e^- \rightarrow \pi^+ \pi^+ \rho^- K^- D^- \textcolor{blue}{D}_s^+ \gamma^I$	4	1	0	1	22
6	$e^- \rightarrow e^+ \rho^0 \pi^- \bar{K}^* \bar{D}^{*0} \textcolor{blue}{D}_s^+ \gamma^I \gamma^I$	5	0	1	1	23
7	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^+ \pi^- K^- D^{*-} \textcolor{blue}{D}_s^+ \gamma^I$	6	0	1	1	24
8	$e^- \rightarrow e^+ \pi^0 K^+ K^- K^- \bar{D}^{*0} \textcolor{blue}{D}_s^+ \gamma^I \gamma^I$	7	0	1	1	25
9	$e^+ e^- \rightarrow \pi^+ \pi^- \bar{D}^0 \textcolor{blue}{D}_s^+ \bar{p}\Lambda$	8	1	0	1	26
10	$e^+ e^- \rightarrow \pi^0 \pi^- \bar{K}^0 \bar{D}^0 \textcolor{blue}{D}_s^+$	9	1	0	1	27
11	$e^+ e^- \rightarrow \pi^- \rho^+ K^- \bar{D}^0 \textcolor{blue}{D}_s^+ \gamma^I \gamma^I \gamma^I$	10	1	0	1	28
12	$e^+ e^- \rightarrow \eta K^0 \bar{K}^0 K^- \bar{D}^0 \textcolor{blue}{D}_s^+ \gamma^I$	11	1	0	1	29
13	$e^- \rightarrow e^+ \pi^- \omega \bar{K}^0 \bar{D}^{*0} \textcolor{blue}{D}_s^+ \gamma^I \gamma^I$	12	0	1	1	30
14	$e^- \rightarrow e^+ \omega K^+ K^- \textcolor{blue}{D}_s^+ D_s^{*-}$	13	0	1	1	31
15	$e^+ e^- \rightarrow \pi^+ \rho^- \omega K^- \bar{D}^{*0} \textcolor{blue}{D}_s^+$	14	1	0	1	32
16	$e^- \rightarrow e^+ \pi^- \rho^+ K^- \bar{D}^{*0} \textcolor{blue}{D}_s^+ \gamma^I$	15	0	1	1	33
17	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^- K^- D^{*-} \textcolor{blue}{D}_s^+$	16	0	1	1	34
18	$e^- \rightarrow e^+ \pi^- \rho^+ K^- \bar{D}^0 \textcolor{blue}{D}_s^+$	17	0	1	1	35
19	$e^- \rightarrow e^+ \pi^+ \eta K^- D^{*-} \textcolor{blue}{D}_s^+$	18	0	1	1	36
20	$e^- \rightarrow e^+ \pi^- \bar{K}^* K^+ K^- \bar{D}^0 \textcolor{blue}{D}_s^+ \gamma^I$	19	0	1	1	37
21	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \omega K^{*-} \bar{D}^{*0} \textcolor{blue}{D}_s^+ \gamma^I$	20	0	1	1	38
22	$e^- \rightarrow e^+ \pi^- \bar{K}^0 K^+ K^- \bar{D}^0 \textcolor{blue}{D}_s^+$	21	0	1	1	39
23	$e^+ e^- \rightarrow \pi^0 \rho^0 \bar{D}^0 \textcolor{blue}{D}_s^+ \bar{p}\Lambda \gamma^I$	22	1	0	1	40
24	$e^- \rightarrow e^+ \rho^0 \pi^+ \pi^- \bar{K}^0 D^{*-} \textcolor{blue}{D}_s^+ \gamma^I$	23	0	1	1	41
25	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ K^- D^{*-} \textcolor{blue}{D}_s^+$	24	1	0	1	42
26	$e^+ e^- \rightarrow \pi^+ \rho^- K^- \bar{D}^{*0} \textcolor{blue}{D}_s^+$	25	1	0	1	43

Table 18: Production branches of  $D^{*+}$ .

rowNo	production branch of $D^{*+}$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
1	$e^+e^- \rightarrow \pi^0\pi^0\pi^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	11	2	0	2	2
2	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\textcolor{blue}{D}^{*+}\gamma^I$	36	2	0	2	4
3	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	64	0	2	2	6
4	$e^- \rightarrow e^+\pi^0\pi^+\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}$	3	0	1	1	7
5	$e^+e^- \rightarrow \rho^0\pi^-\rho^+\rho^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	4	1	0	1	8
6	$e^- \rightarrow e^+\pi^0\pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	5	0	1	1	9
7	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	6	0	1	1	10
8	$e^- \rightarrow e^+\pi^-\pi^-\rho^+\omega\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I\gamma^I$	7	0	1	1	11
9	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\rho^-\textcolor{blue}{D}^{*+}\gamma^I$	8	1	0	1	12
10	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I\gamma^I$	9	1	0	1	13
11	$e^- \rightarrow e^+\pi^0\pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I\gamma^I$	10	0	1	1	14
12	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}$	0	1	0	1	15
13	$e^+e^- \rightarrow \pi^-\bar{K}^*K^+\textcolor{blue}{D}^{*+}\gamma^I\gamma^I$	12	1	0	1	16
14	$e^- \rightarrow e^+\pi^-K^-K^{*+}\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	13	0	1	1	17
15	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^{*0}$	14	1	0	1	18
16	$e^- \rightarrow e^+\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I\gamma^I\gamma^I\gamma^I$	15	0	1	1	19
17	$e^- \rightarrow e^+\rho^-\eta K^0\bar{K}^0\textcolor{blue}{D}^{*+}\bar{D}^{*0}$	16	0	1	1	20
18	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I\gamma^I$	17	1	0	1	21
19	$e^- \rightarrow e^+\pi^0\pi^-\pi^-\rho^+\textcolor{blue}{D}^{*+}\bar{D}^0$	18	0	1	1	22
20	$e^- \rightarrow e^+\rho^0\pi^+\pi^-\eta D^-\textcolor{blue}{D}^{*+}\gamma^I\gamma^I$	19	0	1	1	23
21	$e^- \rightarrow e^+\pi^+\pi^-\pi^-\pi^-\rho^+\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	20	0	1	1	24
22	$e^- \rightarrow e^+\pi^0\rho^0\pi^-\eta\textcolor{blue}{D}^{*+}\bar{D}^0$	21	0	1	1	25
23	$e^- \rightarrow e^+\pi^+\pi^-\rho^-\omega\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	22	0	1	1	26
24	$e^+e^- \rightarrow \pi^+\pi^-\eta\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I$	23	1	0	1	27
25	$e^- \rightarrow e^+\pi^+\pi^-\eta\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I$	24	0	1	1	28
26	$e^- \rightarrow e^+\pi^0\pi^-\bar{K}^*K^{*+}D^-\textcolor{blue}{D}^{*+}\gamma^I$	25	0	1	1	29
27	$e^- \rightarrow e^+\pi^-\omega K^+\textcolor{blue}{D}^{*+}D_s^-\gamma^I$	26	0	1	1	30
28	$e^- \rightarrow e^+\pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	27	0	1	1	31
29	$e^+e^- \rightarrow \pi^+\rho^-\omega K^0\textcolor{blue}{D}^{*+}D_s^{*-}\gamma^I\gamma^I$	28	1	0	1	32
30	$e^- \rightarrow e^+\pi^0\pi^0\pi^-\pi^-\rho^+\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	29	0	1	1	33
31	$e^+e^- \rightarrow \pi^0\pi^-\bar{K}^+K^-\textcolor{blue}{D}^{*+}\bar{D}^0$	30	1	0	1	34
32	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-D^-\textcolor{blue}{D}^{*+}\gamma^I$	31	1	0	1	35

rowNo	production branch of $D^{*+}$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
33	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-K^+\textcolor{blue}{D}^{*+}D_s^-\gamma^I$	32	1	0	1	36
34	$e^+e^- \rightarrow \pi^0\eta K^0K^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	33	1	0	1	37
35	$e^+e^- \rightarrow \rho^0\pi^-\bar{K}^0K^+D^-\textcolor{blue}{D}^{*+}\gamma^I$	34	1	0	1	38
36	$e^+e^- \rightarrow \pi^0\pi^-K^+K^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}$	35	1	0	1	39
37	$e^- \rightarrow e^+\pi^0\pi^-K^+\textcolor{blue}{D}^{*+}D_s^-\gamma^I$	1	0	1	1	40
38	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}$	37	1	0	1	41
39	$e^- \rightarrow e^+\pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}$	38	0	1	1	42
40	$e^- \rightarrow e^+\pi^0\pi^-\eta\eta\omega\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I\gamma^I$	39	0	1	1	43
41	$e^- \rightarrow e^+\rho^-K^0\bar{K}^0K^+K^-\textcolor{blue}{D}^{*+}\bar{D}^0$	40	0	1	1	44
42	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\eta\omega\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I$	41	1	0	1	45
43	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\eta\omega\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I$	42	0	1	1	46
44	$e^+e^- \rightarrow \pi^-\textcolor{blue}{D}^{*+}\bar{D}^0p\bar{p}$	43	1	0	1	47
45	$e^+e^- \rightarrow \pi^0\pi^0\pi^-\rho^+\omega D^-\textcolor{blue}{D}^{*+}\gamma^I$	44	1	0	1	48
46	$e^- \rightarrow e^+\pi^0\pi^-\rho^+\eta D^-\textcolor{blue}{D}^{*+}$	45	0	1	1	49
47	$e^+e^- \rightarrow \pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I\gamma^I$	46	1	0	1	50
48	$e^+e^- \rightarrow \pi^0\rho^0\pi^-\textcolor{blue}{D}^{*+}\bar{D}^0$	47	1	0	1	51
49	$e^- \rightarrow e^+\pi^0\pi^-\pi^-\rho^+\eta'\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I\gamma^I$	48	0	1	1	52
50	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\pi^-D^-\textcolor{blue}{D}^{*+}\gamma^I$	49	0	1	1	53
51	$e^- \rightarrow e^+\pi^0\omega K^0K^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I\gamma^I$	50	0	1	1	54
52	$e^+e^- \rightarrow \pi^0\pi^-\bar{K}^0K^+\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I\gamma^I$	51	1	0	1	55
53	$e^- \rightarrow e^+\pi^0\pi^+K^0K^-\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\gamma^I\gamma^I$	52	0	1	1	56
54	$e^+e^- \rightarrow \pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	53	1	0	1	57
55	$e^+e^- \rightarrow \pi^-\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}\bar{n}\Delta^+\gamma^I$	54	1	0	1	58
56	$e^- \rightarrow e^+\pi^+\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}n\bar{\Delta}^-\gamma^I$	55	0	1	1	59
57	$e^+e^- \rightarrow \pi^+\pi^-\pi^-K^+\textcolor{blue}{D}^{*+}D_s^-$	56	1	0	1	60
58	$e^+e^- \rightarrow \pi^0\pi^0\rho^0K^0K^-\textcolor{blue}{D}^{*+}\bar{D}^0$	57	1	0	1	61
59	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-D^-\textcolor{blue}{D}^{*+}\gamma^I$	58	1	0	1	62
60	$e^- \rightarrow e^+\pi^0\pi^-\rho^+\rho^-\textcolor{blue}{D}^{*+}\bar{D}^0$	59	0	1	1	63
61	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	60	0	1	1	64
62	$e^- \rightarrow e^+\pi^-K^+\textcolor{blue}{D}^{*+}D_s^-\gamma^I\gamma^I$	61	0	1	1	65
63	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	62	1	0	1	66
64	$e^+e^- \rightarrow \pi^0\pi^0\pi^+K^0K^-D^-\textcolor{blue}{D}^{*+}$	63	1	0	1	67
65	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^+\textcolor{blue}{D}^{*+}\textcolor{blue}{D}^{*-}$	2	1	0	1	68
66	$e^+e^- \rightarrow \pi^0\pi^+\rho^-D^-\textcolor{blue}{D}^{*+}\gamma^I$	65	1	0	1	69

rowNo	production branch of $D^{*+}$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
67	$e^+e^- \rightarrow \pi^0\pi^-\pi^-\rho^+\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	66	1	0	1	70
68	$e^+e^- \rightarrow \pi^0\pi^0\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}$	67	1	0	1	71
69	$e^+e^- \rightarrow \pi^0\pi^0\pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I\gamma^I$	68	1	0	1	72
70	$e^- \rightarrow e^+\pi^0\rho^0\pi^-\rho^+D^-\textcolor{blue}{D}^{*+}\gamma^I$	69	0	1	1	73
71	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	70	1	0	1	74
72	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-D^-\textcolor{blue}{D}^{*+}$	71	1	0	1	75
73	$e^- \rightarrow e^+\pi^-\pi^-\rho^+\omega\textcolor{blue}{D}^{*+}\bar{D}^0$	72	0	1	1	76
74	$e^+e^- \rightarrow \textcolor{blue}{D}^{*+}\bar{D}^{*0}\Sigma^0\bar{\Sigma}^-$	73	1	0	1	77
75	$e^+e^- \rightarrow \pi^0\pi^-\rho^+\omega D^-\textcolor{blue}{D}^{*+}\gamma^I\gamma^I$	74	1	0	1	78
76	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\rho^-\textcolor{blue}{D}^{*+}\bar{D}^{*-}\gamma^I\gamma^I\gamma^I$	75	1	0	1	79
77	$e^- \rightarrow e^+\pi^0\rho^0\pi^-\rho^+\textcolor{blue}{D}^{*+}\bar{D}^{*-}\gamma^I\gamma^I\gamma^I$	76	0	1	1	80
78	$e^+e^- \rightarrow \pi^0\pi^+\pi^-D^-\textcolor{blue}{D}^{*+}\gamma^I\gamma^I$	77	1	0	1	81
79	$e^- \rightarrow e^+\pi^+\pi^+\pi^-\rho^-D^-\textcolor{blue}{D}^{*+}$	78	0	1	1	82
80	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^{*-}$	79	1	0	1	83
81	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^{*-}$	80	0	1	1	84
82	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\eta\textcolor{blue}{D}^{*+}\bar{D}^0$	81	1	0	1	85
83	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*-}$	82	1	0	1	86
84	$e^- \rightarrow e^+\pi^0\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*-}$	83	0	1	1	87
85	$e^- \rightarrow e^+\pi^0\pi^-\bar{K}^*K^+D^-\textcolor{blue}{D}^{*+}$	84	0	1	1	88
86	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	85	0	1	1	89
87	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	86	1	0	1	90
88	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*-}\gamma^I$	87	1	0	1	91
89	$e^- \rightarrow e^+\pi^0\pi^0\pi^+\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*-}\gamma^I$	88	0	1	1	92
90	$e^- \rightarrow e^+\pi^-\rho^+\omega D^-\textcolor{blue}{D}^{*+}\gamma^I$	89	0	1	1	93
91	$e^+e^- \rightarrow \rho^0\rho^0\pi^-\textcolor{blue}{D}^{*+}\bar{D}^0$	90	1	0	1	94
92	$e^+e^- \rightarrow \pi^-K^+K^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}$	91	1	0	1	95
93	$e^+e^- \rightarrow \pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}\gamma^I$	92	1	0	1	96
94	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}\bar{D}^{*-}\gamma^I$	93	1	0	1	97
95	$e^- \rightarrow e^+\pi^+\pi^-\pi^-\rho^+\textcolor{blue}{D}^{*+}\bar{D}^{*-}\gamma^I$	94	0	1	1	98
96	$e^+e^- \rightarrow \pi^-\eta K^+\textcolor{blue}{D}^{*+}D_s^-$	95	1	0	1	99
97	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*+}\bar{D}^{*0}$	96	0	1	1	100
98	$e^+e^- \rightarrow \pi^0\rho^-K^+K^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	97	1	0	1	101
99	$e^- \rightarrow e^+\pi^+\pi^-\rho^-\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	98	0	1	1	102
100	$e^- \rightarrow e^+\pi^+\pi^-\pi^-\omega\textcolor{blue}{D}^{*+}\bar{D}^0\gamma^I$	99	0	1	1	103

rowNo	production branch of $D^{*+}$		iProdBrP	nCase	nCcCase	nAllCase	nCCase
rest	others	(8 in total)	—	4	4	8	111

Table 19: Production branches of  $D^{*0}$ .

rowNo	production branch of $D^{*0}$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
1	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^- \eta D^- \textcolor{blue}{D}^{*0}$	31	0	2	2	2
2	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^- \pi^- \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	42	0	2	2	4
3	$e^+ e^- \rightarrow \rho^0 \pi^+ \pi^- \textcolor{blue}{D}^{*0} \bar{D}^{*0}$	78	2	0	2	6
4	$e^- \rightarrow e^+ \rho^0 \pi^+ \pi^- \textcolor{blue}{D}^{*0} \bar{D}^{*0}$	79	0	2	2	8
5	$e^+ e^- \rightarrow \pi^+ \pi^+ \rho^- \omega D^{*-} \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	4	1	0	1	9
6	$e^+ e^- \rightarrow \eta \omega K^+ K^- \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	5	1	0	1	10
7	$e^+ e^- \rightarrow \pi^+ \rho^- \eta \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	6	1	0	1	11
8	$e^- \rightarrow e^+ \pi^0 \rho^0 \pi^+ D^- \textcolor{blue}{D}^{*0} \gamma^I$	7	0	1	1	12
9	$e^+ e^- \rightarrow \pi^+ \pi^+ \pi^- \pi^- K^{*+} \textcolor{blue}{D}^{*0} D_s^{*-}$	8	1	0	1	13
10	$e^+ e^- \rightarrow K^+ K^{*-} \textcolor{blue}{D}^{*0} p \bar{\Lambda}_c^-$	9	1	0	1	14
11	$e^- \rightarrow e^+ \pi^+ D^- \textcolor{blue}{D}^{*0} \gamma^I$	10	0	1	1	15
12	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \pi^- D^- \textcolor{blue}{D}^{*0} \gamma^I$	11	1	0	1	16
13	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^- \pi^- \omega \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	12	0	1	1	17
14	$e^+ e^- \rightarrow \pi^+ K^+ K^{*-} D^{*-} \textcolor{blue}{D}^{*0} \gamma^I$	13	1	0	1	18
15	$e^- \rightarrow e^+ \pi^0 \pi^0 \pi^0 \pi^+ \pi^- \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	14	0	1	1	19
16	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^+ \pi^- \omega D^{*-} \textcolor{blue}{D}^{*0}$	15	0	1	1	20
17	$e^+ e^- \rightarrow \pi^0 \pi^0 \rho^0 \pi^+ \pi^- \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	16	1	0	1	21
18	$e^+ e^- \rightarrow \pi^0 \pi^0 K^+ K^- \bar{D}^0 \textcolor{blue}{D}^{*0}$	17	1	0	1	22
19	$e^+ e^- \rightarrow \pi^+ D^{*-} \textcolor{blue}{D}^{*0} \gamma^I \gamma^I \gamma^I \gamma^I$	18	1	0	1	23
20	$e^+ e^- \rightarrow \rho^+ \eta K^0 \bar{K}^0 D^{*-} \textcolor{blue}{D}^{*0}$	19	1	0	1	24
21	$e^+ e^- \rightarrow \pi^0 \pi^- \eta \bar{K}^0 K^+ \bar{D}^0 \textcolor{blue}{D}^{*0}$	20	1	0	1	25
22	$e^+ e^- \rightarrow \pi^- \rho^+ \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	21	1	0	1	26
23	$e^+ e^- \rightarrow \pi^+ \pi^- \rho^+ \omega D^{*-} \textcolor{blue}{D}^{*0} \gamma^I$	22	1	0	1	27
24	$e^+ e^- \rightarrow \pi^+ \rho^- K^- K^{*+} \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	23	1	0	1	28
25	$e^- \rightarrow e^+ \pi^0 \pi^0 \pi^+ \pi^- \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	24	0	1	1	29
26	$e^+ e^- \rightarrow \pi^+ \pi^- \rho^+ K^0 \textcolor{blue}{D}^{*0} D_s^{*-} \gamma^I$	25	1	0	1	30
27	$e^+ e^- \rightarrow \pi^0 \pi^+ \pi^+ \pi^- \pi^- \textcolor{blue}{D}^{*0} \bar{D}^{*0}$	26	1	0	1	31
28	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^+ \pi^- \pi^- \textcolor{blue}{D}^{*0} \bar{D}^{*0}$	27	0	1	1	32
29	$e^- \rightarrow e^+ \pi^0 \rho^0 K^+ K^- \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	28	0	1	1	33
30	$e^- \rightarrow e^+ \pi^0 \pi^0 \rho^+ K^* \textcolor{blue}{D}^{*0} D_s^{*-}$	29	0	1	1	34
31	$e^- \rightarrow e^+ \pi^+ \pi^- \eta K^+ \textcolor{blue}{D}^{*0} D_s^{*-} \gamma^I$	30	0	1	1	35
32	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- K^+ \textcolor{blue}{D}^{*0} D_s^{*-}$	0	0	1	1	36

rowNo	production branch of $D^{*0}$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
33	$e^- \rightarrow e^+ \rho^0 \bar{D}^0 \textcolor{blue}{D}^{*0}$	32	0	1	1	37
34	$e^+ e^- \rightarrow \rho^0 \pi^+ K^* \textcolor{blue}{D}^{*0} D_s^- \gamma^I \gamma^I$	33	1	0	1	38
35	$e^+ e^- \rightarrow \pi^0 \pi^+ \rho^- \omega \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	34	1	0	1	39
36	$e^- \rightarrow e^+ \pi^0 \eta \bar{K}^0 K^+ D^{*-} \textcolor{blue}{D}^{*0} \gamma^I$	35	0	1	1	40
37	$e^+ e^- \rightarrow \pi^0 K^+ K^- \textcolor{blue}{D}^{*0} D_s^- \gamma^I \gamma^I$	36	1	0	1	41
38	$e^- \rightarrow e^+ \pi^0 K^+ \textcolor{blue}{D}^{*0} D_s^{*-} \gamma^I \gamma^I$	37	0	1	1	42
39	$e^- \rightarrow e^+ \pi^0 \pi^+ K^+ K^- D^{*-} \textcolor{blue}{D}^{*0}$	38	0	1	1	43
40	$e^+ e^- \rightarrow \pi^- \rho^+ \bar{D}^0 \textcolor{blue}{D}^{*0}$	39	1	0	1	44
41	$e^+ e^- \rightarrow \pi^0 \rho^0 \pi^+ \pi^- \pi^- D^- \textcolor{blue}{D}^{*0}$	40	1	0	1	45
42	$e^- \rightarrow e^+ \pi^0 \pi^0 \pi^- \rho^+ \bar{D}^0 \textcolor{blue}{D}^{*0}$	41	0	1	1	46
43	$e^+ e^- \rightarrow \pi^0 \pi^+ \pi^- \rho^+ \rho^- \textcolor{blue}{D}^{*0} \bar{D}^{*0}$	1	1	0	1	47
44	$e^+ e^- \rightarrow \pi^+ \omega K^0 \textcolor{blue}{D}^{*0} D_s^- \gamma^I \gamma^I$	43	1	0	1	48
45	$e^- \rightarrow e^+ \pi^0 \pi^+ \rho^+ \rho^- D^- \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	44	0	1	1	49
46	$e^- \rightarrow e^+ \pi^0 \pi^- \rho^+ \rho^+ \textcolor{blue}{D}^{*0} n \bar{\Lambda}_c^- \gamma^I$	45	0	1	1	50
47	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \rho^+ \rho^- \bar{D}^0 \textcolor{blue}{D}^{*0}$	46	0	1	1	51
48	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^- D^{*-} \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	47	0	1	1	52
49	$e^+ e^- \rightarrow \pi^0 \pi^0 \omega \bar{D}^0 \textcolor{blue}{D}^{*0}$	48	1	0	1	53
50	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \rho^+ D^- \textcolor{blue}{D}^{*0}$	49	0	1	1	54
51	$e^+ e^- \rightarrow \pi^0 \pi^+ \pi^+ \rho^- \eta' D^{*-} \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	50	1	0	1	55
52	$e^- \rightarrow e^+ \pi^- \rho^+ \omega K^+ \textcolor{blue}{D}^{*0} D_s^-$	51	0	1	1	56
53	$e^+ e^- \rightarrow \pi^0 \pi^0 \rho^0 \bar{D}^0 \textcolor{blue}{D}^{*0}$	52	1	0	1	57
54	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^- \pi^- K^+ K^- \bar{D}^0 \textcolor{blue}{D}^{*0}$	53	0	1	1	58
55	$e^+ e^- \rightarrow \pi^+ \rho^- K^+ \textcolor{blue}{D}^{*0} D_s^- \gamma^I$	54	1	0	1	59
56	$e^- \rightarrow e^+ \pi^+ \omega D^{*-} \textcolor{blue}{D}^{*0} \gamma^I$	55	0	1	1	60
57	$e^+ e^- \rightarrow \rho^+ \textcolor{blue}{D}^{*0} \Sigma^- \bar{\Xi}_c^0 \gamma^I$	56	1	0	1	61
58	$e^+ e^- \rightarrow \pi^+ \pi^+ \pi^- \pi^- \textcolor{blue}{D}^{*0} \bar{D}^{*0} \gamma^I$	57	1	0	1	62
59	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^- \pi^- \textcolor{blue}{D}^{*0} \bar{D}^{*0} \gamma^I$	58	0	1	1	63
60	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^0 \bar{D}^0 \textcolor{blue}{D}^{*0}$	59	1	0	1	64
61	$e^- \rightarrow e^+ \pi^0 \rho^0 \pi^+ \pi^- \bar{D}^0 \textcolor{blue}{D}^{*0}$	60	0	1	1	65
62	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^- D^{*-} \textcolor{blue}{D}^{*0} \gamma^I$	61	1	0	1	66
63	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	62	0	1	1	67
64	$e^- \rightarrow e^+ \pi^0 \rho^0 \pi^+ \pi^- \eta \bar{D}^0 \textcolor{blue}{D}^{*0} \gamma^I$	63	0	1	1	68
65	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \rho^+ D^{*-} \textcolor{blue}{D}^{*0} \gamma^I$	64	0	1	1	69
66	$e^+ e^- \rightarrow \pi^0 \rho^+ D^- \textcolor{blue}{D}^{*0} \gamma^I \gamma^I$	65	1	0	1	70

rowNo	production branch of $D^{*0}$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
67	$e^+e^- \rightarrow \pi^+\pi^-\rho^+\omega D^- \textcolor{blue}{D}^{*0}\gamma^I\gamma^I$	66	1	0	1	71
68	$e^- \rightarrow e^+\pi^0\pi^0\pi^+D^{*-} \textcolor{blue}{D}^{*0}$	67	0	1	1	72
69	$e^+e^- \rightarrow \pi^+\pi^-\omega \bar{D}^0 \textcolor{blue}{D}^{*0}\gamma^I$	68	1	0	1	73
70	$e^- \rightarrow e^+\pi^0\pi^0\pi^0\rho^-\rho^+\omega \bar{D}^0 \textcolor{blue}{D}^{*0}$	69	0	1	1	74
71	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\eta D^- \textcolor{blue}{D}^{*0}\gamma^I$	70	1	0	1	75
72	$e^+e^- \rightarrow \rho^0\pi^-\rho^+\textcolor{blue}{D}^{*0}\bar{D}^{*0}\gamma^I\gamma^I$	71	1	0	1	76
73	$e^- \rightarrow e^+\rho^0\pi^+\rho^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}\gamma^I\gamma^I$	72	0	1	1	77
74	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}\gamma^I\gamma^I$	73	1	0	1	78
75	$e^- \rightarrow e^+\pi^0\pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}\gamma^I\gamma^I$	74	0	1	1	79
76	$e^- \rightarrow e^+D^{*-} \textcolor{blue}{D}^{*0}\bar{\Sigma}^0\Sigma^+$	75	0	1	1	80
77	$e^+e^- \rightarrow \pi^+\omega\omega D^- \textcolor{blue}{D}^{*0}\gamma^I$	76	1	0	1	81
78	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-\bar{D}^0 \textcolor{blue}{D}^{*0}$	77	1	0	1	82
79	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\rho^+\rho^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}$	2	0	1	1	83
80	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^-\rho^+\bar{D}^0 \textcolor{blue}{D}^{*0}$	3	1	0	1	84
81	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\omega \bar{D}^0 \textcolor{blue}{D}^{*0}\gamma^I$	80	0	1	1	85
82	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}$	81	1	0	1	86
83	$e^- \rightarrow e^+\pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}$	82	0	1	1	87
84	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}$	83	1	0	1	88
85	$e^- \rightarrow e^+\pi^0\pi^0\pi^+\pi^-\textcolor{blue}{D}^{*0}\bar{D}^{*0}$	84	0	1	1	89
86	$e^+e^- \rightarrow \pi^0\pi^0\pi^-\rho^+\bar{D}^0 \textcolor{blue}{D}^{*0}\gamma^I$	85	1	0	1	90
87	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^+D^{*-} \textcolor{blue}{D}^{*0}\gamma^I$	86	1	0	1	91
88	$e^- \rightarrow e^+\pi^0\pi^+\pi^+\pi^-\textcolor{blue}{D}^{*0}\gamma^I$	87	0	1	1	92
89	$e^+e^- \rightarrow \pi^+\rho^-\bar{D}^0 \textcolor{blue}{D}^{*0}$	88	1	0	1	93
90	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\bar{K}^0 K^{*+} \bar{D}^0 \textcolor{blue}{D}^{*0}\gamma^I$	89	1	0	1	94
91	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^+\bar{D}^0 \textcolor{blue}{D}^{*0}\gamma^I$	90	1	0	1	95
92	$e^- \rightarrow e^+\pi^+K^+K^-D^{*-} \textcolor{blue}{D}^{*0}$	91	0	1	1	96
93	$e^- \rightarrow e^+\pi^+\pi^+\pi^-\textcolor{blue}{D}^{*-} \textcolor{blue}{D}^{*0}\gamma^I$	92	0	1	1	97
94	$e^- \rightarrow e^+\pi^0\rho^+\eta D^- \textcolor{blue}{D}^{*0}\gamma^I$	93	0	1	1	98
95	$e^- \rightarrow e^+\pi^+\pi^-\rho^+D^- \textcolor{blue}{D}^{*0}$	94	0	1	1	99
96	$e^+e^- \rightarrow \pi^0\pi^+\pi^+\pi^-\textcolor{blue}{D}^{*-} \textcolor{blue}{D}^{*0}$	95	1	0	1	100
97	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\textcolor{blue}{D}^{*0}\bar{D}^{*0}\gamma^I$	96	1	0	1	101
98	$e^- \rightarrow e^+\pi^0\pi^0\pi^0\textcolor{blue}{D}^{*0}\bar{D}^{*0}\gamma^I$	97	0	1	1	102
99	$e^+e^- \rightarrow \pi^0\rho^0\pi^-\rho^+\bar{D}^0 \textcolor{blue}{D}^{*0}$	98	1	0	1	103
100	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\omega K^{*+} \textcolor{blue}{D}^{*0}D_s^- \gamma^I$	99	1	0	1	104

rowNo	production branch of $D^{*0}$		iProdBrP	nCase	nCcCase	nAllCase	nCCase
rest	others	(20 in total)	—	7	13	20	124

Table 20: Production branches of  $D^0$ .

rowNo	production branch of $D^0$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
1	$D^{*+} \rightarrow \pi^+ \textcolor{blue}{D^0}$	0	46	44	90	90
2	$D^{*0} \rightarrow \pi^0 \textcolor{blue}{D^0}$	2	39	42	81	171
3	$D^{*0} \rightarrow \textcolor{blue}{D^0} \gamma$	5	22	21	43	214
4	$e^- \rightarrow e^+ \pi^0 \pi^0 \pi^+ D^{*-} \textcolor{blue}{D^0} \gamma^I$	12	0	2	2	216
5	$e^+ e^- \rightarrow \pi^0 \pi^+ \rho^- \textcolor{blue}{D^0} \bar{D}^0$	45	2	0	2	218
6	$e^- \rightarrow e^+ \pi^0 \pi^- \rho^+ \textcolor{blue}{D^0} \bar{D}^0$	46	0	2	2	220
7	$e^+ e^- \rightarrow \pi^+ \pi^+ \pi^- \textcolor{blue}{D^0} \bar{D}^{*0} \gamma^I$	61	2	0	2	222
8	$e^+ e^- \rightarrow \pi^+ \pi^- \textcolor{blue}{D^0} \bar{D}^0 \gamma^I \gamma^I$	95	2	0	2	224
9	$e^- \rightarrow e^+ \pi^+ \pi^- \textcolor{blue}{D^0} \bar{D}^0 \gamma^I \gamma^I$	96	0	2	2	226
10	$e^+ e^- \rightarrow \pi^0 \pi^+ \pi^+ \pi^- D^{*-} \textcolor{blue}{D^0} \gamma^I$	97	2	0	2	228
11	$e^+ e^- \rightarrow \pi^0 \pi^+ \pi^- \omega \textcolor{blue}{D^0} \bar{D}^0 \gamma^I$	148	2	0	2	230
12	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \omega \textcolor{blue}{D^0} \bar{D}^0 \gamma^I$	149	0	2	2	232
13	$e^- \rightarrow e^+ \eta \omega K^+ K^- \textcolor{blue}{D^0} \bar{D}^{*0} \gamma^I \gamma^I$	10	0	1	1	233
14	$e^- \rightarrow e^+ \pi^- \rho^+ \eta \textcolor{blue}{D^0} \bar{D}^{*0} \gamma^I \gamma^I$	11	0	1	1	234
15	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \rho^- D^- \textcolor{blue}{D^0} \gamma^I$	3	0	1	1	235
16	$e^- \rightarrow e^+ \rho^+ K^+ K^- D^- \textcolor{blue}{D^0} \gamma^I$	13	0	1	1	236
17	$e^- \rightarrow e^+ \pi^0 \pi^0 K^+ \textcolor{blue}{D^0} D_s^- \gamma^I \gamma^I$	14	0	1	1	237
18	$e^+ e^- \rightarrow \pi^+ \pi^+ \pi^- \pi^- \omega \textcolor{blue}{D^0} \bar{D}^{*0} \gamma^I \gamma^I$	15	1	0	1	238
19	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^- \rho^+ \rho^- \textcolor{blue}{D^0} \bar{D}^0$	16	1	0	1	239
20	$e^- \rightarrow e^+ \pi^0 \pi^+ \rho^+ \rho^- \rho^- \textcolor{blue}{D^0} \bar{D}^0$	17	0	1	1	240
21	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^0 \pi^- \textcolor{blue}{D^0} \bar{D}^{*0} \gamma^I$	18	1	0	1	241
22	$e^- \rightarrow e^+ \pi^0 \pi^0 \rho^0 \pi^- \textcolor{blue}{D^0} \bar{D}^{*0} \gamma^I$	19	0	1	1	242
23	$e^+ e^- \rightarrow \pi^0 \pi^- \rho^+ \textcolor{blue}{D^0} \bar{D}^0 \gamma^I$	20	1	0	1	243
24	$e^- \rightarrow e^+ \pi^0 \pi^+ \rho^- \textcolor{blue}{D^0} \bar{D}^0 \gamma^I$	21	0	1	1	244
25	$e^- \rightarrow e^+ \pi^0 \pi^0 K^+ K^- \textcolor{blue}{D^0} \bar{D}^{*0}$	22	0	1	1	245
26	$e^- \rightarrow e^+ \pi^0 \pi^0 \rho^0 \pi^+ \pi^- \rho^+ D^{*-} \textcolor{blue}{D^0} \gamma^I \gamma^I$	23	0	1	1	246
27	$e^+ e^- \rightarrow \pi^0 K^+ K^{*-} \textcolor{blue}{D^0} \bar{D}^0 \gamma^I$	24	1	0	1	247
28	$e^- \rightarrow e^+ \pi^0 K^- K^{*-} \textcolor{blue}{D^0} \bar{D}^0 \gamma^I$	25	0	1	1	248
29	$e^+ e^- \rightarrow \pi^0 \pi^+ \pi^+ \rho^- D^{*-} \textcolor{blue}{D^0}$	26	1	0	1	249
30	$e^- \rightarrow e^+ \pi^0 \pi^+ \eta K^0 K^- \textcolor{blue}{D^0} \bar{D}^{*0}$	27	0	1	1	250
31	$e^+ e^- \rightarrow K^+ K^+ K^- K^{*-} \textcolor{blue}{D^0} \bar{D}^0 \gamma^I \gamma^I$	28	1	0	1	251
32	$e^- \rightarrow e^+ K^+ K^- K^- K^{*-} \textcolor{blue}{D^0} \bar{D}^0 \gamma^I \gamma^I$	29	0	1	1	252

rowNo	production branch of $D^0$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
33	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \bar{K}^0 K^+ D^- \textcolor{blue}{D}^0$	30	0	1	1	253
34	$e^- \rightarrow e^+ \pi^- \rho^+ K^+ \textcolor{blue}{D}^0 D_s^{*-} \gamma^I$	31	0	1	1	254
35	$e^- \rightarrow e^+ \pi^+ \rho^- \textcolor{blue}{D}^0 \bar{D}^{*0} \gamma^I$	32	0	1	1	255
36	$e^+ e^- \rightarrow \pi^+ \pi^- \omega \textcolor{blue}{D}^0 \bar{D}^0 \gamma^I$	33	1	0	1	256
37	$e^- \rightarrow e^+ \pi^+ \pi^- \omega \textcolor{blue}{D}^0 \bar{D}^0 \gamma^I$	34	0	1	1	257
38	$e^+ e^- \rightarrow \pi^+ \pi^+ \pi^+ \pi^- \rho^- D^{*-} \textcolor{blue}{D}^0 \gamma^I$	35	1	0	1	258
39	$e^- \rightarrow e^+ \pi^+ \pi^+ \pi^+ \pi^- \pi^- \omega D^- \textcolor{blue}{D}^0 \gamma^I \gamma^I$	36	0	1	1	259
40	$e^+ e^- \rightarrow \pi^0 \rho^0 \pi^+ \eta D^{*-} \textcolor{blue}{D}^0$	37	1	0	1	260
41	$e^- \rightarrow e^+ \pi^- \rho^+ K^+ K^{*-} \textcolor{blue}{D}^0 \bar{D}^{*0} \gamma^I$	38	0	1	1	261
42	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^+ \rho^- \omega D^- \textcolor{blue}{D}^0 \gamma^I$	39	0	1	1	262
43	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \textcolor{blue}{D}^0 \bar{D}^{*0} \gamma^I \gamma^I$	40	1	0	1	263
44	$e^- \rightarrow e^+ \pi^0 \omega K^+ \textcolor{blue}{D}^0 D_s^{*-} \gamma^I \gamma^I$	41	0	1	1	264
45	$e^+ e^- \rightarrow \pi^+ \omega D^{*-} \textcolor{blue}{D}^0 \gamma^I$	42	1	0	1	265
46	$e^+ e^- \rightarrow \rho^0 \rho^0 \pi^- \rho^+ \rho^+ D^- \textcolor{blue}{D}^0 \gamma^I$	43	1	0	1	266
47	$e^+ e^- \rightarrow \pi^0 \rho^0 K^+ K^- \textcolor{blue}{D}^0 \bar{D}^{*0} \gamma^I$	44	1	0	1	267
48	$e^- \rightarrow e^+ \rho^0 \pi^+ \rho^+ \rho^- D^{*-} \textcolor{blue}{D}^0 \gamma^I$	4	0	1	1	268
49	$e^- \rightarrow e^+ \pi^+ K^0 K^+ K^- \textcolor{blue}{D}^0 D_s^{*-} \gamma^I$	1	0	1	1	269
50	$e^+ e^- \rightarrow \pi^+ \pi^- \rho^+ \eta K^- K^{*+} D^- \textcolor{blue}{D}^0 \gamma^I$	47	1	0	1	270
51	$e^+ e^- \rightarrow \rho^0 \textcolor{blue}{D}^0 \bar{D}^{*0}$	48	1	0	1	271
52	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \rho^- D^{*-} \textcolor{blue}{D}^0 \gamma^I$	49	1	0	1	272
53	$e^- \rightarrow e^+ \pi^0 \pi^- \rho^+ \omega \textcolor{blue}{D}^0 \bar{D}^{*0} \gamma^I$	50	0	1	1	273
54	$e^- \rightarrow e^+ \pi^0 \pi^+ K^+ K^- D^{*-} \textcolor{blue}{D}^0$	51	0	1	1	274
55	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ D^- \textcolor{blue}{D}^0 \gamma^I \gamma^I$	52	1	0	1	275
56	$e^- \rightarrow e^+ \rho^0 \rho^+ D^- \textcolor{blue}{D}^0 \gamma^I \gamma^I$	53	0	1	1	276
57	$e^- \rightarrow e^+ \pi^+ \rho^- \textcolor{blue}{D}^0 \bar{D}^{*0}$	54	0	1	1	277
58	$e^- \rightarrow e^+ \pi^0 \pi^+ \eta K^0 \bar{K}^0 D^- \textcolor{blue}{D}^0$	55	0	1	1	278
59	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \rho^- \textcolor{blue}{D}^0 \bar{D}^{*0}$	56	1	0	1	279
60	$e^- \rightarrow e^+ \pi^+ \pi^- \textcolor{blue}{D}^0 D_s^- p\bar{\Lambda}$	57	0	1	1	280
61	$e^- \rightarrow e^+ \pi^0 \pi^+ \pi^- \textcolor{blue}{D}^0 p\bar{\Lambda}_c^-$	58	0	1	1	281
62	$e^- \rightarrow e^+ \pi^0 \pi^+ K^0 \textcolor{blue}{D}^0 D_s^-$	59	0	1	1	282
63	$e^- \rightarrow e^+ \pi^+ \rho^- K^+ \textcolor{blue}{D}^0 D_s^- \gamma^I \gamma^I$	60	0	1	1	283
64	$e^- \rightarrow e^+ \pi^0 \pi^0 \pi^0 \pi^+ \rho^- \textcolor{blue}{D}^0 \bar{D}^{*0}$	6	0	1	1	284
65	$e^- \rightarrow e^+ \eta K^0 \bar{K}^0 K^+ \textcolor{blue}{D}^0 D_s^- \gamma^I$	62	0	1	1	285
66	$e^+ e^- \rightarrow \pi^0 \pi^+ \eta \eta \omega D^{*-} \textcolor{blue}{D}^0 \gamma^I \gamma^I$	63	1	0	1	286

rowNo	production branch of $D^0$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
67	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-\textcolor{blue}{D}^0\bar{D}^0\gamma^I$	64	1	0	1	287
68	$e^- \rightarrow e^+\pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\textcolor{blue}{D}^0\bar{D}^0\gamma^I$	65	0	1	1	288
69	$e^+e^- \rightarrow \rho^+K^0\bar{K}^0K^+K^-D^{*-}\textcolor{blue}{D}^0$	66	1	0	1	289
70	$e^+e^- \rightarrow \omega\textcolor{blue}{D}^0\bar{D}^0\Sigma^+\bar{\Sigma}^-\gamma^I\gamma^I$	67	1	0	1	290
71	$e^- \rightarrow e^+\omega\textcolor{blue}{D}^0\bar{D}^0\Sigma^+\bar{\Sigma}^-\gamma^I\gamma^I$	68	0	1	1	291
72	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+\rho^-\textcolor{blue}{D}^0\bar{D}^{*0}$	69	1	0	1	292
73	$e^+e^- \rightarrow \pi^+\pi^+\pi^-D^-\textcolor{blue}{D}^0\gamma^I$	70	1	0	1	293
74	$e^- \rightarrow e^+\pi^+D^{*-}\textcolor{blue}{D}^0p\bar{p}$	71	0	1	1	294
75	$e^- \rightarrow e^+\pi^+K^+K^-\textcolor{blue}{D}^0n\bar{\Lambda}_c^-\gamma^I$	72	0	1	1	295
76	$e^- \rightarrow e^+\pi^0\pi^0\omega\omega\textcolor{blue}{D}^0\bar{D}^{*0}$	73	0	1	1	296
77	$e^+e^- \rightarrow \pi^0\rho^0\rho^0K^+K^-\textcolor{blue}{D}^0\bar{D}^0\gamma^I$	74	1	0	1	297
78	$e^- \rightarrow e^+\pi^0\rho^0\rho^0K^+K^-\textcolor{blue}{D}^0\bar{D}^0\gamma^I$	75	0	1	1	298
79	$e^- \rightarrow e^+\pi^0\rho^0\pi^+D^{*-}\textcolor{blue}{D}^0$	76	0	1	1	299
80	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\omega\omega\textcolor{blue}{D}^0\bar{D}^0$	77	1	0	1	300
81	$e^- \rightarrow e^+\pi^0\pi^+\pi^-\omega\omega\textcolor{blue}{D}^0\bar{D}^0$	78	0	1	1	301
82	$e^- \rightarrow e^+\pi^0\pi^0\pi^0\rho^0\textcolor{blue}{D}^0\bar{D}^{*0}$	79	0	1	1	302
83	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-K^+K^-\textcolor{blue}{D}^0\bar{D}^{*0}$	80	1	0	1	303
84	$e^+e^- \rightarrow \rho^0\pi^+\pi^+\pi^-D^-\textcolor{blue}{D}^0\gamma^I$	81	1	0	1	304
85	$e^- \rightarrow e^+\pi^+\pi^-\rho^+D^-\textcolor{blue}{D}^0\gamma^I\gamma^I$	82	0	1	1	305
86	$e^+e^- \rightarrow \pi^0\omega\bar{K}^0K^+D^{*-}\textcolor{blue}{D}^0\gamma^I\gamma^I$	83	1	0	1	306
87	$e^- \rightarrow e^+\pi^0\pi^0\rho^0\bar{K}^0K^+D^{*-}\textcolor{blue}{D}^0$	84	0	1	1	307
88	$e^- \rightarrow e^+\pi^0\pi^0\pi^0\textcolor{blue}{D}^0\bar{D}^{*0}$	85	0	1	1	308
89	$e^+e^- \rightarrow \pi^0\pi^+\rho^+\rho^-D^{*-}\textcolor{blue}{D}^0$	86	1	0	1	309
90	$e^- \rightarrow e^+\pi^0\pi^0\bar{K}^*K^+D^-\textcolor{blue}{D}^0\gamma^I\gamma^I$	87	0	1	1	310
91	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\textcolor{blue}{D}^0\bar{D}^{*0}$	88	1	0	1	311
92	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\textcolor{blue}{D}^0\bar{D}^{*0}\gamma^I\gamma^I$	89	1	0	1	312
93	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\eta\textcolor{blue}{D}^0\bar{D}^{*0}\gamma^I$	90	1	0	1	313
94	$e^+e^- \rightarrow \pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^0\bar{D}^0\gamma^I$	91	1	0	1	314
95	$e^- \rightarrow e^+\pi^+\pi^+\pi^-\pi^-\textcolor{blue}{D}^0\bar{D}^0\gamma^I$	92	0	1	1	315
96	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-\textcolor{blue}{D}^0\bar{D}^0$	93	1	0	1	316
97	$e^- \rightarrow e^+\pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\textcolor{blue}{D}^0\bar{D}^0$	94	0	1	1	317
98	$e^+e^- \rightarrow \pi^0\pi^+\omega D^{*-}\textcolor{blue}{D}^0\gamma^I$	7	1	0	1	318
99	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+D^{*-}\textcolor{blue}{D}^0\gamma^I$	8	1	0	1	319
100	$e^+e^- \rightarrow \pi^0\pi^+D^-\textcolor{blue}{D}^0\gamma^I$	9	1	0	1	320

rowNo	production branch of $D^0$		iProdBrP	nCase	nCcCase	nAllCase	nCCase
rest	others	(58 in total)	—	31	27	58	378

Table 21: Production branches of  $\pi^0$ .

rowNo	production branch of $\pi^0$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
1	$\omega \rightarrow \pi^0 \pi^+ \pi^-$	4	87885	—	87885	87885
2	$\rho^+ \rightarrow \pi^0 \pi^+$	6	81368	0	81368	169253
3	$\rho^- \rightarrow \pi^0 \pi^-$	2	80635	0	80635	249888
4	$\eta \rightarrow \pi^0 \pi^0 \pi^0$	11	41979	—	41979	291867
5	$K_S^0 \rightarrow \pi^0 \pi^0$	24	40298	—	40298	332165
6	$K^{*-} \rightarrow \pi^0 K^-$	15	13007	0	13007	345172
7	$K^{*+} \rightarrow \pi^0 K^+$	31	12685	0	12685	357857
8	$\eta \rightarrow \pi^0 \pi^+ \pi^-$	16	10946	—	10946	368803
9	$K^* \rightarrow \pi^0 K^0$	53	5945	0	5945	374748
10	$\omega \rightarrow \pi^0 \gamma$	14	5828	—	5828	380576
11	$\bar{K}^* \rightarrow \pi^0 \bar{K}^0$	57	5609	0	5609	386185
12	$\eta' \rightarrow \pi^0 \pi^0 \eta$	34	4238	—	4238	390423
13	$K_L^0 \rightarrow \pi^0 \pi^0 \pi^0$	81	3024	—	3024	393447
14	$\Lambda \rightarrow \pi^0 n$	100	1585	0	1585	395032
15	$\bar{\Lambda} \rightarrow \pi^0 \bar{n}$	46	1552	0	1552	396584
16	$\Delta^+ \rightarrow \pi^0 p$	17	1161	0	1161	397745
17	$\bar{\Delta}^- \rightarrow \pi^0 \bar{p}$	18	1054	0	1054	398799
18	$\Sigma^+ \rightarrow \pi^0 p$	61	928	0	928	399727
19	$\bar{\Sigma}^- \rightarrow \pi^0 \bar{p}$	62	923	0	923	400650
20	$\Delta^0 \rightarrow \pi^0 n$	71	798	0	798	401448
21	$\bar{\Delta}^0 \rightarrow \pi^0 \bar{n}$	32	776	0	776	402224
22	$K_L^0 \rightarrow \pi^0 \pi^+ \pi^-$	93	643	—	643	402867
23	$\phi \rightarrow \pi^0 \rho^0$	212	360	—	360	403227
24	$\bar{\Xi}^0 \rightarrow \pi^0 \bar{\Lambda}$	199	358	0	358	403585
25	$\bar{\Sigma}^{*0} \rightarrow \pi^0 \bar{\Lambda}$	526	340	0	340	403925
26	$\Xi^0 \rightarrow \pi^0 \Lambda$	99	322	0	322	404247
27	$\Sigma^{*0} \rightarrow \pi^0 \Lambda$	474	274	0	274	404521
28	$\omega \rightarrow e^+ e^- \pi^0$	395	227	—	227	404748
29	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \omega K^+ K^- \gamma^I$	390	220	0	220	404968
30	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \omega K^+ K^-$	1019	198	0	198	405166
31	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^- \pi^- \rho^+ \omega \gamma^I$	1010	194	0	194	405360
32	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^- \pi^- K^+ K^-$	373	184	0	184	405544
33	$e^+ e^- \rightarrow \pi^0 \pi^0 \pi^+ \pi^+ \pi^- \pi^- \rho^+ \rho^-$	2692	184	0	184	405728

rowNo	production branch of $\pi^0$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
34	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\omega\gamma^I$	762	176	0	176	405904
35	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-K^+K^-$	771	174	0	174	406078
36	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\pi^-\rho^+$	425	170	0	170	406248
37	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-\omega$	1269	168	0	168	406416
38	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-K^+K^-$	827	166	0	166	406582
39	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\gamma^I$	4196	166	0	166	406748
40	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\omega\gamma^I$	405	164	0	164	406912
41	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^+K^+K^-$	1676	164	0	164	407076
42	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\omega K^+K^-$	2267	164	0	164	407240
43	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\rho^-\gamma^I$	2198	158	0	158	407398
44	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\omega$	3239	158	0	158	407556
45	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-K^+K^-\gamma^I$	5235	158	0	158	407714
46	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-$	627	156	0	156	407870
47	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\rho^-$	272	152	0	152	408022
48	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-$	3495	150	0	150	408172
49	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\omega$	362	148	0	148	408320
50	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\omega K^+K^-$	48	147	0	147	408467
51	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\gamma^I$	115	146	0	146	408613
52	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\omega$	458	146	0	146	408759
53	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\gamma^I$	1401	146	0	146	408905
54	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-\omega\gamma^I$	650	144	0	144	409049
55	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\rho^0\pi^+\pi^-K^+K^-$	747	144	0	144	409193
56	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\rho^+\rho^-\gamma^I$	1774	140	0	140	409333
57	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\rho^+\rho^-$	2647	140	0	140	409473
58	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\omega K^+K^-$	321	139	0	139	409612
59	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^-\rho^-K^+K^-\gamma^I$	1742	138	0	138	409750
60	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\omega K^+K^-\gamma^I$	1018	135	0	135	409885
61	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\omega\gamma^I$	1690	135	0	135	410020
62	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\omega$	2218	135	0	135	410155
63	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-K^+K^-$	2689	135	0	135	410290
64	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\rho^+\gamma^I$	1213	134	0	134	410424
65	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-K^+K^-\gamma^I$	178	132	0	132	410556
66	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\gamma^I$	1243	132	0	132	410688
67	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^+\omega$	3382	132	0	132	410820

rowNo	production branch of $\pi^0$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
68	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^+\rho^-$	6829	132	0	132	410952
69	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^+\rho^-\omega$	330	130	0	130	411082
70	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\omega$	2129	129	0	129	411211
71	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\omega\gamma^I$	1129	128	0	128	411339
72	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^+K^+K^-\gamma^I$	1838	128	0	128	411467
73	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-K^+K^-\gamma^I$	5026	128	0	128	411595
74	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-K^+K^-$	145	126	0	126	411721
75	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\omega K^+K^-\gamma^I$	327	126	0	126	411847
76	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^+\rho^-\omega\gamma^I$	528	126	0	126	411973
77	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\rho^+\rho^-K^+K^-$	648	126	0	126	412099
78	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\rho^-\gamma^I$	539	124	0	124	412223
79	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^+\pi^-\omega$	2093	124	0	124	412347
80	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\omega K^+K^-\gamma^I$	3951	124	0	124	412471
81	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-K^+K^-\gamma^I$	10717	123	0	123	412594
82	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\omega\gamma^I$	98	122	0	122	412716
83	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-\rho^+$	120	120	0	120	412836
84	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^-\pi^-\rho^+$	453	120	0	120	412956
85	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\omega\gamma^I$	1411	120	0	120	413076
86	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\rho^-$	1671	120	0	120	413196
87	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\pi^-\rho^+K^+K^-$	1798	120	0	120	413316
88	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\pi^+\pi^+\pi^-\rho^-$	4978	120	0	120	413436
89	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\gamma^I$	1020	118	0	118	413554
90	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\omega K^+K^-$	1384	118	0	118	413672
91	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\pi^-\omega$	1082	117	0	117	413789
92	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\rho^0\pi^+\pi^-\pi^-\rho^+$	3249	117	0	117	413906
93	$e^+e^- \rightarrow \pi^0\pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\rho^-\gamma^I$	5001	117	0	117	414023
94	$e^+e^- \rightarrow \pi^0\rho^0\pi^+\pi^-\pi^-\rho^+\omega$	160	116	0	116	414139
95	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^-\pi^-\pi^-\rho^+$	363	116	0	116	414255
96	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^+\pi^-\rho^-\omega$	568	116	0	116	414371
97	$e^+e^- \rightarrow \pi^0\pi^+\pi^-\rho^+\rho^-K^+K^-$	1179	116	0	116	414487
98	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^-\pi^-K^+K^-\gamma^I$	1346	116	0	116	414603
99	$e^+e^- \rightarrow \pi^0\pi^0\rho^0\pi^+\pi^-\omega\gamma^I$	3396	116	0	116	414719
100	$e^+e^- \rightarrow \pi^0\pi^0\pi^+\pi^+\pi^+\pi^-\pi^-\rho^-\omega$	391	114	0	114	414833
rest	others (42883 in total)	—	—	—	205932	620765

Table 22: Production branches of  $e^+$ .

rowNo	production branch of $e^+$	iProdBrP	nCase	nCcCase	nAllCase	nCCase
1	$\pi^0 \rightarrow e^+e^-$	0	30051	30051	60102	60102
2	$\eta \rightarrow e^+e^-$	2	1085	1085	2170	62272
3	$K_L^0 \rightarrow e^+\bar{\nu}_e\pi^-$	4	0	1106	1106	63378
4	$K_L^0 \rightarrow e^+\nu_e\pi^-$	1	1092	0	1092	64470
5	$\pi^0 \rightarrow e^+e^+e^-e^-$	7	322	322	644	65114
6	$\omega \rightarrow e^+e^-\pi^0$	5	227	227	454	65568
7	$\eta' \rightarrow e^+e^-\pi^+\pi^-$	3	94	94	188	65756
8	$\bar{\Sigma}^0 \rightarrow e^+e^-\bar{\Lambda}$	10	42	41	83	65839
9	$\Sigma^0 \rightarrow e^+e^-\Lambda$	11	41	42	83	65922
10	$\eta \rightarrow e^+e^-\pi^+\pi^-$	8	37	37	74	65996
11	$K_S^0 \rightarrow e^+\bar{\nu}_e\pi^-$	9	0	52	52	66048
12	$K_S^0 \rightarrow e^+\nu_e\pi^-$	13	47	0	47	66095
13	$\omega \rightarrow e^+e^-$	16	12	12	24	66119
14	$\bar{\Lambda} \rightarrow e^+\nu_e\bar{p}$	6	15	5	20	66139
15	$D^0 \rightarrow e^+\nu_e K^-$	15	6	10	16	66155
16	$K_S^0 \rightarrow e^+e^-\pi^+\pi^-$	18	6	6	12	66167
17	$\rho^0 \rightarrow e^+e^-$	20	6	6	12	66179
18	$D^+ \rightarrow e^+\nu_e \bar{K}^0$	19	4	6	10	66189
19	$D^0 \rightarrow e^+\nu_e K^{*-}$	17	3	5	8	66197
20	$\phi \rightarrow e^+e^-\eta$	12	3	3	6	66203
21	$\phi \rightarrow e^+e^-$	22	3	3	6	66209
22	$\bar{\Sigma}^+ \rightarrow e^+\nu_e\bar{n}$	23	4	2	6	66215
23	$D^+ \rightarrow e^+\nu_e \bar{K}^*$	24	4	2	6	66221
24	$D_s^+ \rightarrow e^+\nu_e\eta$	21	1	0	1	66222
25	$D_s^+ \rightarrow e^+\nu_e\eta'$	14	1	0	1	66223
26	$D^+ \rightarrow e^+\nu_e\eta$	25	0	1	1	66224
27	$D^0 \rightarrow e^+\nu_e\pi^-$	26	0	1	1	66225
28	$\bar{\Sigma}^+ \rightarrow e^+\nu_e\bar{\Lambda}$	27	1	0	1	66226
29	$D^0 \rightarrow e^+\nu_e\rho^-$	28	0	1	1	66227

Table 23: Mothers of  $D_s^+$ .

rowNo	mother of $D_s^+$	PDGMoth	nCase	nCcCase	nAllCase	nCCase
1	$e^+e^-$	99999999	11	13	24	24
2	$D_s^{*+}$	433	12	7	19	43

Table 24: Mothers of  $D^{*+}$ .

rowNo	mother of $D^{*+}$	PDGMoth	nCase	nCcCase	nAllCase	nCCase
1	$e^+e^-$	99999999	59	52	111	111

Table 25: Mothers of  $D^{*0}$ .

rowNo	mother of $D^{*0}$	PDGMoth	nCase	nCcCase	nAllCase	nCCase
1	$e^+e^-$	99999999	61	63	124	124

Table 26: Mothers of  $D^0$ .

rowNo	mother of $D^0$	PDGMoth	nCase	nCcCase	nAllCase	nCCase
1	$e^+e^-$	99999999	80	84	164	164
2	$D^{*0}$	423	61	63	124	288
3	$D^{*+}$	413	46	44	90	378

Table 27: Mothers of  $\pi^0$ .

rowNo	mother of $\pi^0$	PDGMoth	nCase	nCcCase	nAllCase	nCCase
1	$e^+e^-$	99999999	215315	—	215315	215315
2	$\rho^-$	-213	80635	81368	162003	377318
3	$\omega$	223	93964	—	93964	471282
4	$\eta$	221	52937	—	52937	524219
5	$K_S^0$	310	40298	—	40298	564517
6	$K^{*-}$	-323	13007	12685	25692	590209
7	$K^*$	313	5945	5609	11554	601763
8	$\eta'$	331	4317	—	4317	606080
9	$K_L^0$	130	3667	—	3667	609747
10	$\bar{\Lambda}$	-3122	1552	1585	3137	612884
11	$\Delta^+$	2214	1161	1054	2215	615099
12	$\Sigma^+$	3222	928	923	1851	616950
13	$\bar{\Delta}^0$	-2114	776	798	1574	618524
14	$\Xi^0$	3322	322	358	680	619204
15	$\Sigma^{*0}$	3214	274	340	614	619818
16	$\phi$	333	432	—	432	620250
17	$\bar{D}^0$	-421	65	62	127	620377
18	$\bar{D}^{*0}$	-423	42	39	81	620458
19	$\rho^0$	113	57	—	57	620515
20	$D^-$	-411	17	29	46	620561
21	$\bar{\Xi}^{*+}$	-3314	24	19	43	620604
22	$\bar{\Sigma}^{*-}$	-3224	21	20	41	620645
23	$\Xi^{*0}$	3324	25	14	39	620684
24	$\bar{\Sigma}^{*+}$	-3114	9	14	23	620707
25	$D^{*-}$	-413	7	13	20	620727
26	$a_1^-$	-20213	7	6	13	620740
27	$D_s^+$	431	4	6	10	620750
28	$\Omega^-$	3334	1	3	4	620754
29	$f_0(980)$	9010221	4	—	4	620758
30	$\tau^-$	15	1	1	2	620760
31	$D_s^{*+}$	433	2	0	2	620762
32	$\bar{K}_1^{\prime 0}$	-20313	1	0	1	620763
33	$\bar{\Xi}_c^{*0}$	-4314	1	0	1	620764

rowNo	mother of $\pi^0$	PDGMoth	nCase	nCcCase	nAllCase	nCCase
34	$\bar{\Lambda}_c^-$	-4122	1	0	1	620765

Table 28: Mothers of  $e^+$ .

rowNo	mother of $e^+$	PDGMoth	nCase	nCcCase	nAllCase	nCCase
1	$\pi^0$	111	30373	30373	60746	60746
2	$\eta$	221	1122	1122	2244	62990
3	$K_L^0$	130	1092	1106	2198	65188
4	$\omega$	223	239	239	478	65666
5	$\eta'$	331	94	94	188	65854
6	$K_S^0$	310	53	58	111	65965
7	$\bar{\Sigma}^0$	-3212	42	41	83	66048
8	$\Sigma^0$	3212	41	42	83	66131
9	$D^0$	421	9	17	26	66157
10	$\bar{\Lambda}$	-3122	15	5	20	66177
11	$D^+$	411	8	9	17	66194
12	$\phi$	333	6	6	12	66206
13	$\rho^0$	113	6	6	12	66218
14	$\bar{\Sigma}^+$	-3112	5	2	7	66225
15	$D_s^+$	431	2	0	2	66227