

Bulkgrav 74x selections	1000	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
entries	50000	50000	50000	50000	48400	50000	50000	50000	50000	50000	50000
nVtx>=1	50000	50000	50000	50000	48400	50000	50000	50000	50000	50000	50000
triggers	45552	48807	49516	49782	48297	49934	49954	49979	49986	49996	49996
Pt>200GeV and tightId	45271	48700	49448	49736	48256	49895	49915	49942	49949	49956	49959
$ \eta  < 2.4$	45190	48659	49405	49710	48244	49881	49906	49939	49945	49953	49959
$ \Delta\eta  < 1.3$	40891	42500	42869	42840	41794	43008	43045	43227	43178	43105	42942
Mjj>1000	17546	39660	42354	42712	41761	42986	43038	43226	43175	43105	42942
105<fatjetPRmassL2L3Corr<135	4623	11837	12139	12127	11643	11717	11370	10830	10310	9926	9353
$\tau$ 2L1 two LP at least one HP	4586	11743	12044	12046	11543	11627	11263	10731	10199	9786	9227
0-btagged	5	12	15	13	27	28	62	115	203	345	459
1-btagged	76	217	251	287	370	423	717	1114	1565	1921	2298
2-btagged	538	1494	1657	1877	2048	2384	3062	3738	3932	4010	3741
3-btagged	1736	4649	4886	5079	4867	4990	4782	4150	3477	2837	2269
4-btagged	2231	5371	5235	4790	4231	3802	2640	1614	1022	673	460
HPHP3-btagged	1529	4213	4380	4557	4374	4490	4197	3617	2990	2370	1839

Table 1: cutflow.

Bulkgrav 76x selections		1000	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
2	entries	50000	50000	50000	50000	50000	50000	49200	49800	0	49200	48200
	nVtx>=1	50000	50000	50000	50000	50000	50000	49200	49800	0	49200	48200
	triggers	46278	48972	49637	49854	49935	49971	49190	49798	0	49199	48200
	Pt>200GeV and tightId	45939	48823	49553	49810	49890	49941	49155	49761	0	49150	48164
	$ \eta  < 2.4$	45861	48779	49517	49786	49874	49931	49147	49756	0	49147	48164
	$ \Delta\eta  < 1.3$	41394	42694	42923	42946	43218	43098	42395	43108	0	42391	41377
	Mjj>1000	14341	39304	42312	42798	43157	43077	42388	43107	0	42391	41377
	105<fatjetPRmassL2L3Corr<135	3832	11269	11431	11363	11651	11414	11001	10867	0	9656	9093
	$\tau$ 2L1 two LP at least one HP	3813	11185	11349	11282	11574	11326	10889	10762	0	9535	8971
	0-btagged	8	8	16	12	14	15	27	39	0	84	106
	1-btagged	70	170	175	217	231	296	339	528	0	810	996
	2-btagged	442	1284	1423	1473	1573	1690	1992	2428	0	2844	2979
	3-btagged	1438	4390	4560	4549	4863	4696	4705	4688	0	3950	3417
	4-btagged	1855	5333	5175	5031	4893	4629	3826	3079	0	1847	1473
	HPHP3-btagged	1285	3983	4141	4085	4346	4170	4181	4118	0	3398	2973

Table 2: cutflow.

Radiation 74x selections	1000	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
entries	49000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
nVtx>=1	49000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
triggers	34242	40723	43432	45162	46213	47059	48162	48662	49093	49267	49420
Pt>200GeV and tightId	33879	40435	43200	44951	46013	46875	47963	48417	48812	48915	49008
$ \eta  < 2.4$	33782	40317	43093	44845	45879	46744	47811	48264	48643	48713	48788
$ \Delta\eta  < 1.3$	27908	29747	29828	29752	29790	29916	29605	29479	29180	29069	28946
Mjj>1000	11726	27193	29003	29251	29439	29668	29448	29403	29122	29042	28927
105<fatjetPRmassL2L3Corr<135	2926	7777	8131	7952	8043	7872	7532	7237	6928	6419	6327
$\tau_{21}$ two LP at least one HP	2902	7729	8068	7885	7978	7796	7454	7167	6845	6336	6223
0-btagged	0	8	8	9	17	16	42	69	124	194	307
1-btagged	62	143	175	221	252	295	454	686	973	1238	1530
2-btagged	336	980	1164	1208	1432	1576	2018	2380	2645	2598	2588
3-btagged	1139	2928	3236	3317	3319	3277	3173	2937	2392	1892	1486
4-btagged	1365	3670	3485	3130	2958	2632	1767	1095	711	414	312
HPHP3-btagged	1007	2625	2907	2976	2960	2935	2834	2589	2059	1585	1204

Table 3: cutflow.

Radiation 76x selections	1000	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
entries	50000	50000	50000	49200	50000	49200	49200	49200	48400	0	50000
nVtx>=1	50000	50000	50000	49200	50000	49200	49200	49200	48400	0	50000
triggers	36068	41407	44012	44881	46691	46641	47684	48058	47632	0	49461
Pt>200GeV and tightId	35450	40976	43678	44531	46383	46387	47418	47808	47347	0	49044
$ \eta  < 2.4$	35356	40864	43552	44430	46273	46266	47305	47657	47197	0	48856
$ \Delta\eta  < 1.3$	28919	29885	29885	29392	29942	29571	29384	29075	28221	0	28946
Mjj>1000	9648	26780	28864	28818	29471	29259	29188	28958	28164	0	28922
105<fatjetPRmassL2L3Corr<135	2494	7423	7757	7613	7709	7466	7445	6972	6684	0	6355
$\tau$ 2L1 two LP at least one HP	2480	7376	7705	7553	7654	7406	7372	6898	6601	0	6277
0-btagged	3	5	6	8	12	11	14	14	30	0	73
1-btagged	37	114	120	136	160	181	245	319	430	0	615
2-btagged	305	860	931	1040	1101	1145	1332	1561	1760	0	1981
3-btagged	937	2896	3078	3002	3129	3049	3214	3032	2761	0	2549
4-btagged	1198	3501	3570	3367	3252	3020	2567	1972	1620	0	1059
HPHP3-btagged	837	2632	2787	2689	2773	2735	2838	2714	2429	0	2184

Table 4: cutflow.

BulkgravBtagSF 74x selections		1000	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
0-btagged		8.80755	9.64414	17.3344	12.7953	14.3254	14.1878	24.9027	33.5309	0	72.4345	91.975
1-btagged		74.9511	185.348	185.401	220.854	229.631	285.721	318.222	483.307	0	747.207	915.184
2-btagged		466.088	1353.15	1460.42	1480.57	1544.59	1640.76	1899.28	2307.94	0	2735.43	2891.02
3-btagged		1456.85	4443.18	4576.51	4536.72	4828.63	4650.86	4657.76	4689.52	0	4028.17	3508.75
4-btagged		1788.23	5196.11	5116.76	5045.74	4972.45	4752.11	4010.4	3272.4	0	1993.7	1601.5
HPHP3-btagged		1303.76	4029.37	4153.72	4069.9	4308.25	4124.06	4136.39	4113.64	0	3464.68	3051.06

57

Table 5: cutflow.

RadionBtagSF 76x selections	1000	1200	1400	1600	1800	2000	2500	3000	3500	4000	4500
0-btagged	3.28585	5.48963	6.74352	8.17361	12.2831	10.194	12.9167	12.5052	26.7573	0	63.869
1-btagged	38.9216	122.713	126.535	139.27	157.505	175.4	228.658	295.265	396.978	0	566.552
2-btagged	314.305	906.285	956.152	1046.65	1086.8	1106.29	1272.17	1491.39	1685.42	0	1924.17
3-btagged	943.167	2924.79	3087.05	2995.43	3109.83	3030.57	3187.82	3032.22	2790.94	0	2616.25
4-btagged	1152.89	3404.67	3525.5	3373.8	3300.48	3098.1	2688.1	2093.71	1734.1	0	1150.74
HPHP3-btagged	843.164	2659.41	2795.36	2680.14	2752.98	2712.91	2810.81	2712.68	2455.76	0	2241.39

Table 6: cutflow.