Study of top pair production near threshold

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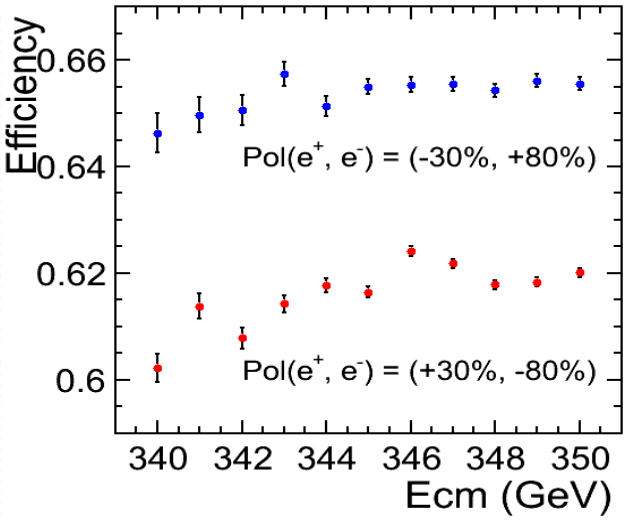
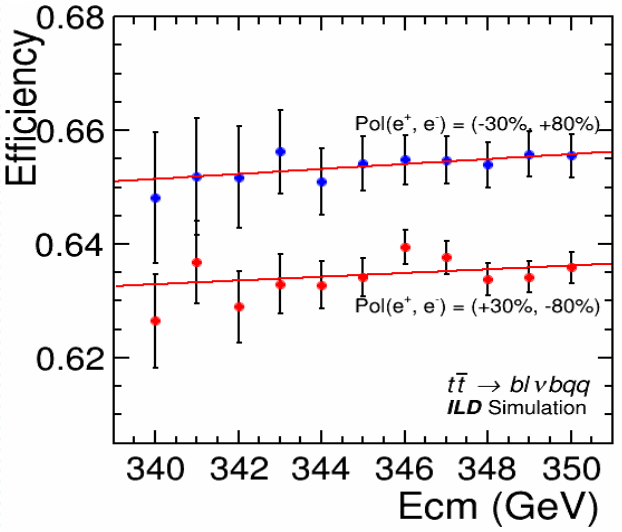
Today's Report

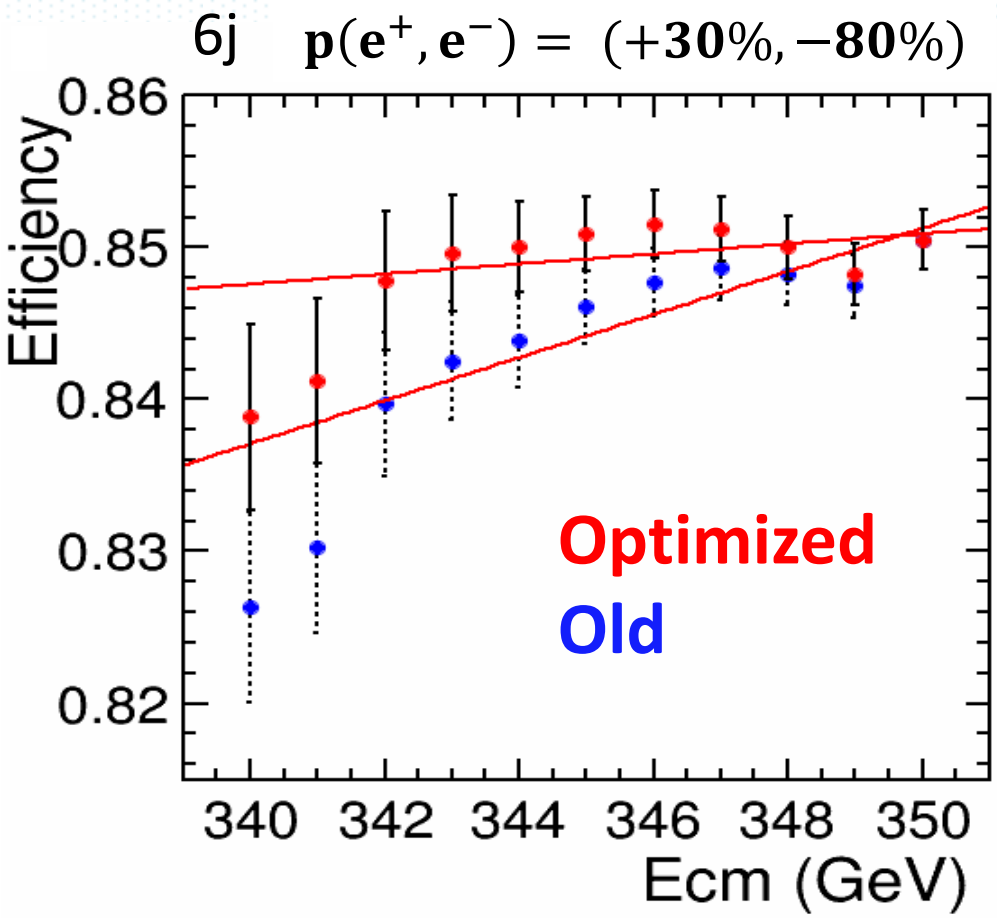
- New result
  - Optimizing the E_{Vis} cut for each E_{CM}
  - 10 fb^{-1} / 22 point -> 5 fb^{-1} / 20 point





4j efficiency plot which is previous report. Its source code was wrong for the calculation of its error.

Optimizing the E_{vis} cut



Using optimized E_{vis} cut,
the efficiencies of low energy region were improved !!

10 fb^{-1} / 22 point -> 5 fb^{-1} / 20 point

Left 10fb^{-1}	tt4j	tt6j	tt2j	WW	ZZ	ZH	6f+4f	S_{4j}
Generated	3166	3287	762	65328	6008	1389	130817	11.2
# of lepton = 1	2406	135	224	1484	119	103	60007	9.5
btag > 0.1 × 2	2245	127	212	111	32	35	2661	30.5
Thrust < 0.845	2184	126	185	21	15	29	404	40.1
230 < Evis < 360	2142	40	183	3	4	22	397	40.5
missPt < 38 GeV	1996	27	77	2	4	16	127	42.1
m_t > 100 GeV × 2	1971	18	66	1	3	14	83	42.4
# of pfos > 50 # of pfos < 160	1963	17	53	1	3	12	55	**42.8**

Left 5fb^{-1}	tt4j	tt6j	tt2j	WW	ZZ	ZH	6f+4f	S_{4j}
Generated	1583	1643	381	32664	3004	694	65408	7.9
# of lepton = 1	1203	67	112	742	59	51	30003	6.7
btag > 0.1 × 2	1122	63	106	55	16	17	1330	21.6
Thrust < 0.845	1092	63	92	10	7	14	201	28.4
230 < Evis < 360	1048	45	50	8	6	12	77	29.6
missPt < 38 GeV	1027	16	49	1	2	8	75	29.9
m_t > 100 GeV × 2	1011	10	40	0	1	7	45	30.2
# of pfos > 50 # of pfos < 160	1006	9	31	0	1	6	30	**30.5**

Top yukawa (10 fb^{-1} / 22 point -> 5 fb^{-1} / 20 point)

$$\frac{\delta y_t}{y_t} \sim \frac{109 \times \frac{1}{2} \times \frac{\delta\sigma}{\sigma}}{9}$$

Stat. error 110 fb^{-1}	6-Jet (Left)	6-Jet (Right)	4-Jet (Left)	4-Jet (Right)	Combined 220 fb^{-1}
Cross section	0.83%	1.2%	0.9%	1.3%	
Top yukawa	5.0%	7.2%	5.1%	7.9%	3.0%

Stat. Error (50 fb^{-1})	6-Jet (Left)	6-Jet (Right)	4-Jet (Left)	4-Jet (Right)	6 + 4-Jet (Left)	6 + 4-Jet (Right)	Combined (100 fb^{-1})
Cross section	1.2%	1.7%	1.3%	1.9%	0.9%	1.3%	
Top yukawa	7.2%	10.2%	8.0%	11.3%	5.4%	7.6%	**4.4%**

Mass & width

Old

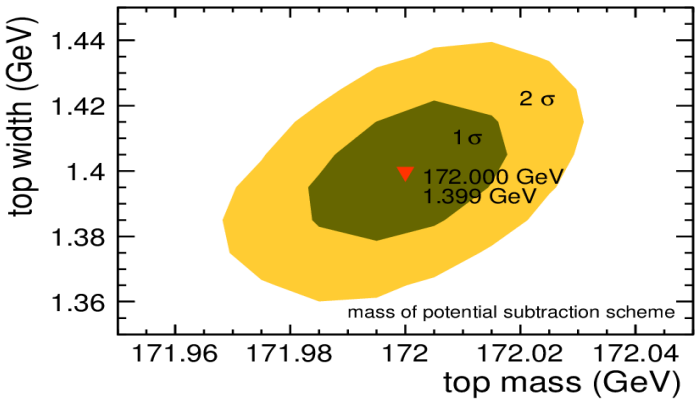
Statistical Error (MeV)	6-Jet		4-Jet	
	m_t^{PS}	Γ_t	m_t^{PS}	Γ_t
Left(110fb^{-1})	23	29	24	30
Right(110fb^{-1})	34	42	33	42
Left (110fb^{-1}) + Right(110fb^{-1})	**20**	**24**	**19**	**25**

Combined all	m_t^{PS}(GeV)	Γ_t(GeV)
	14 MeV	17 MeV

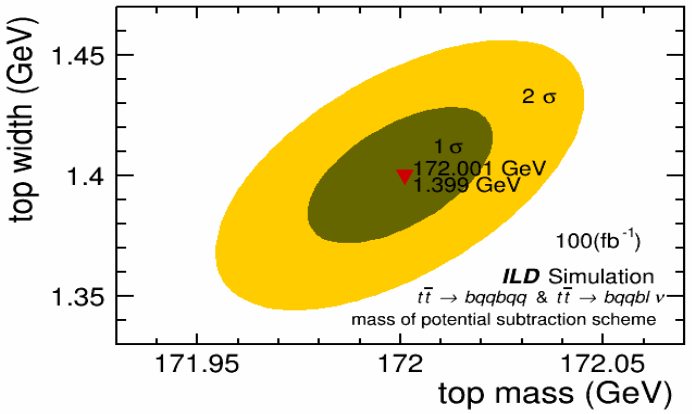
New

Statistical Error (MeV)	6-Jet		4-Jet	
	m_t^{PS}	Γ_t	m_t^{PS}	Γ_t
Left(50fb^{-1})	28	40	33	48
Right(50fb^{-1})	42	63	48	67
Left (50fb^{-1}) + Right(50fb^{-1})	**23**	**34**	**27**	**39**

Combined	m_t^{PS}(GeV)	Γ_t(GeV)
	18MeV	**26MeV**



Previous fig. Only 6jet



New fig. 6jet + 4jet

plan

After LCWS, AFB study will be started.