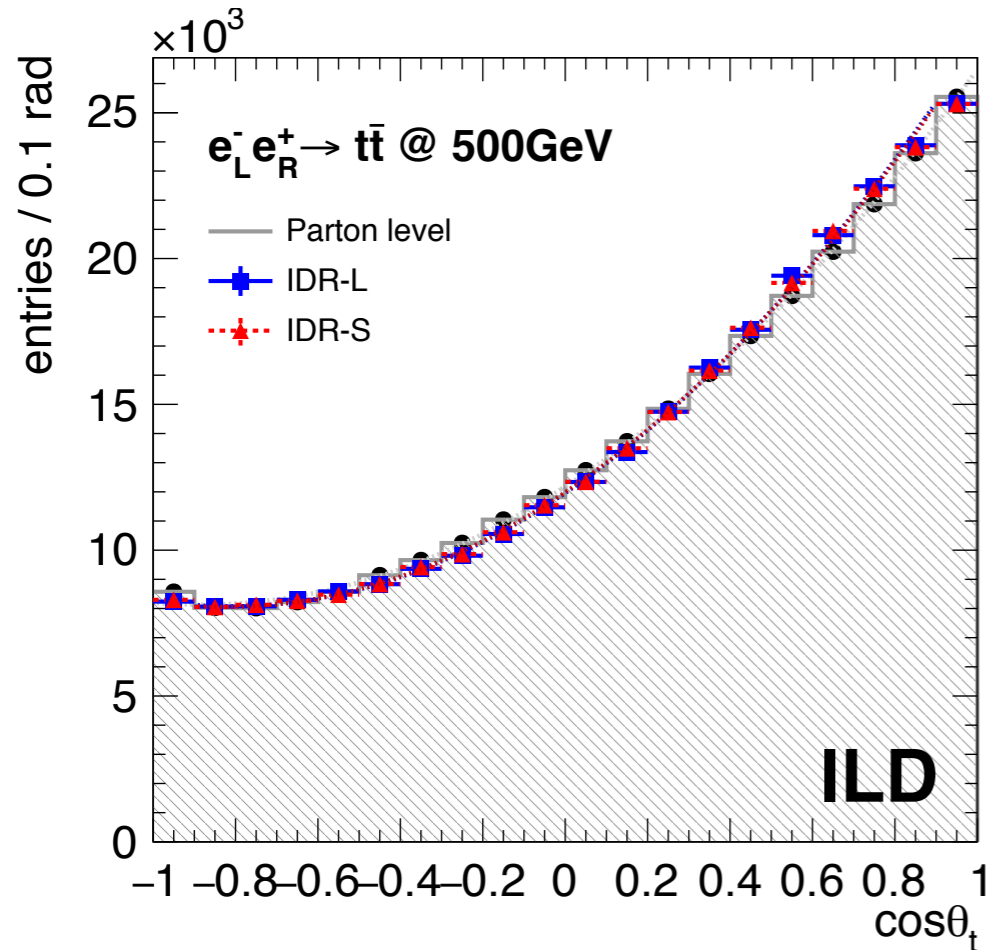


Update 07/23/19

Yuichi Okugawa

Chi2<15 & Method All



Afb gen	0.328685	N: 1812768	Afb gen	0.328848	N: 1866364
Afb reco	0.341900	N: 277435	Afb reco	0.340474	N: 284183
Final efficiency	30.609%		Final efficiency	30.4531%	

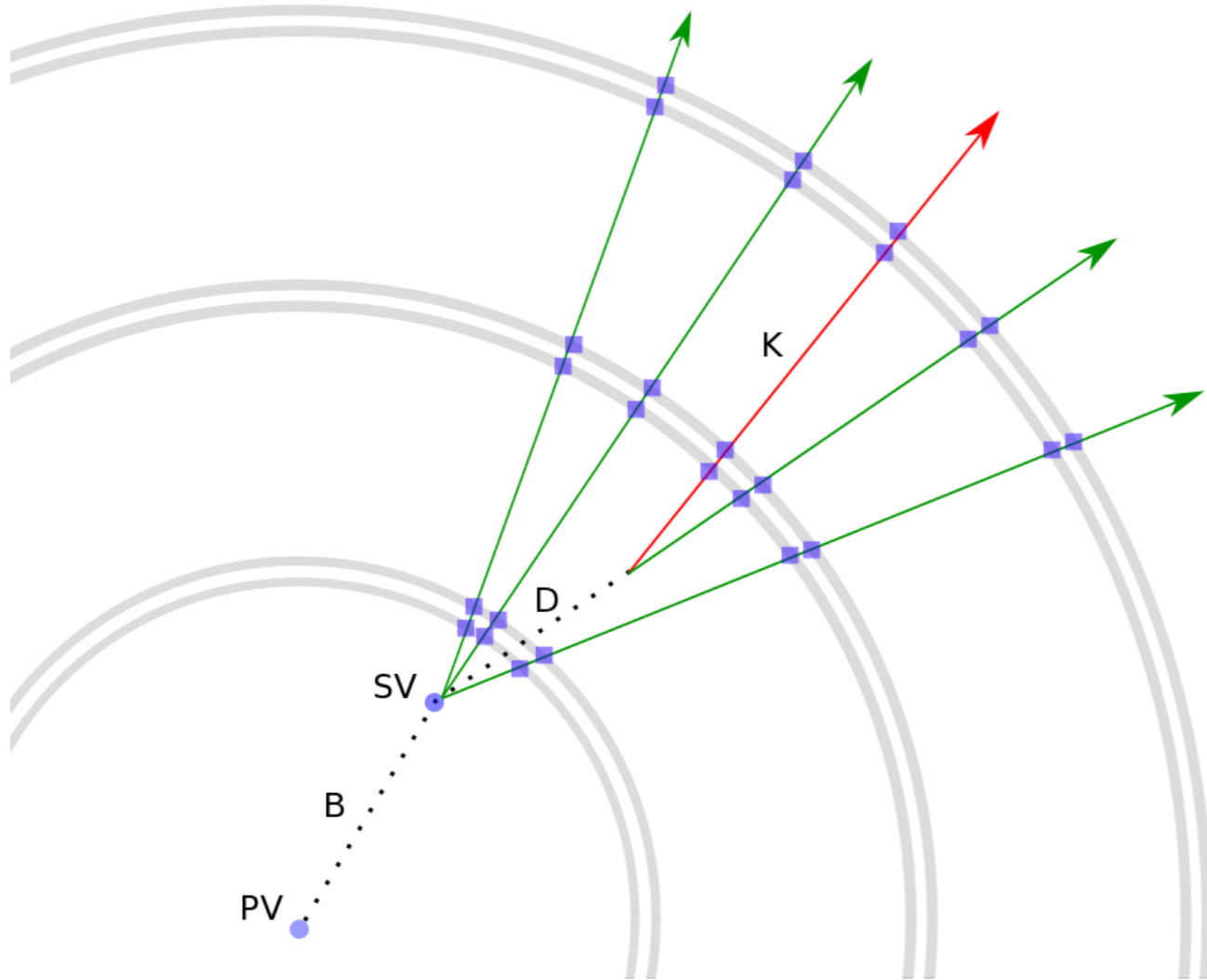
Table 3: l5 final efficiency and A_{fb}

Table 4: s5 final efficiency and A_{fb}

$e_L^- e_R^+ \rightarrow t\bar{t}$ at 500 GeV		
	IDR-L	IDR-S
Isolated Lepton	92.1%	92.1%
$btag_1 > 0.8$ or $btag_2 > 0.3$	81.2%	81.1%
Thrust < 0.9	81.2%	81.1%
Hadronic mass	78.2%	78.2%
Reconstructed m_W and m_t	73.4%	73.4%

*with **b** momentum from GetHadronMomentum()

b momentum calculation



GetHadronMomentum()

Sums up the **magnitudes** of the momentums from particles associated to the vertices.

GetB()->getMomentum()

Sums up the **vector components** of the momentums from particles associated to the vertices.



Potential missing prongs from the reconstructed vertices when inherited from VertexRestorer to QQbar

chi2 and cuts

Baseline Cuts

- Iso. Lep. > 15 GeV
- Hadronic Mass
 $180 < M_{\text{Had}} < 420$
- btag1 > 0.8 or btag2 > 0.3
- thrust > 0.9
- top1 mass: $120 < m_{\text{t1}} < 270$
- W1 mass: $50 < m_{\text{W1}} < 250$

Lorentz Gamma cuts

- $\gamma_t^{\text{had}} + \gamma_t^{\text{lep}} > 2.4$
- $\gamma_t^{\text{lep}} < 2.0$

B momentum cut

- $|p_{\text{had}}| > 15 \text{ GeV}$

chi2 and cuts

$$\chi_{cut}^2 = \chi_{topMass}^2 + \chi_{cosWb}^2 + \chi_{p_b^*}^2$$

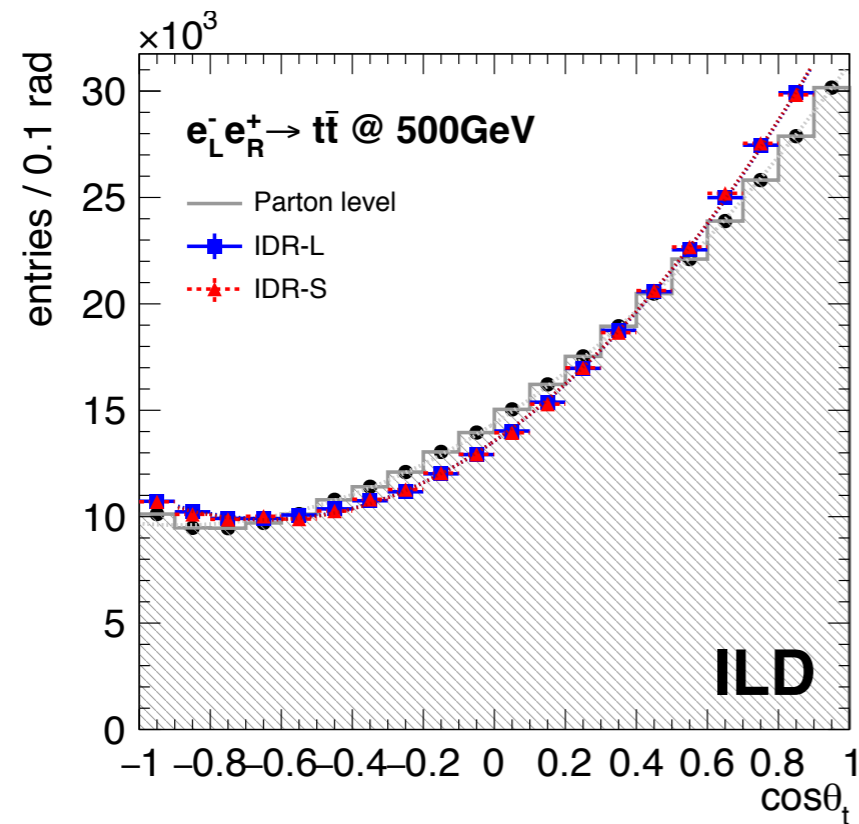
$$\chi_{topMass}^2 = \frac{(m_{top} - 174)^2}{6.3^2}$$

$$\chi_{cosWb}^2 = \frac{(\cos \theta_{Wb} - 0.23)^2}{0.14^2}$$

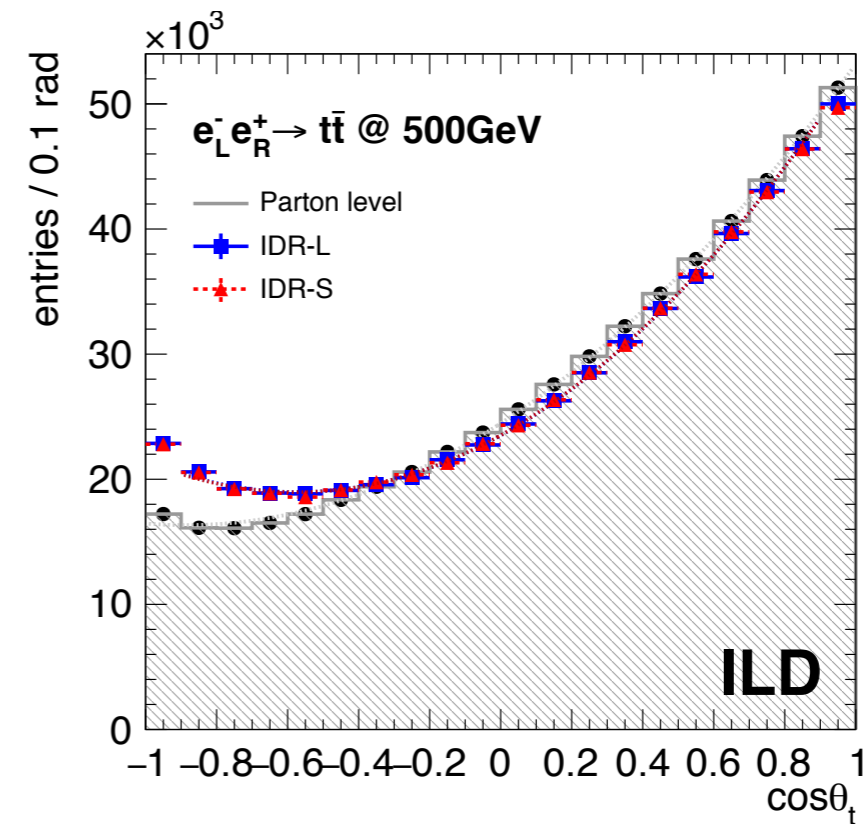
$$\chi_{p_b^*}^2 = \frac{(p_b^* - 68.0)^2}{5.0^2}$$

p_b^* is the momentum of b quark at top frame

Chi2 and NoMethod



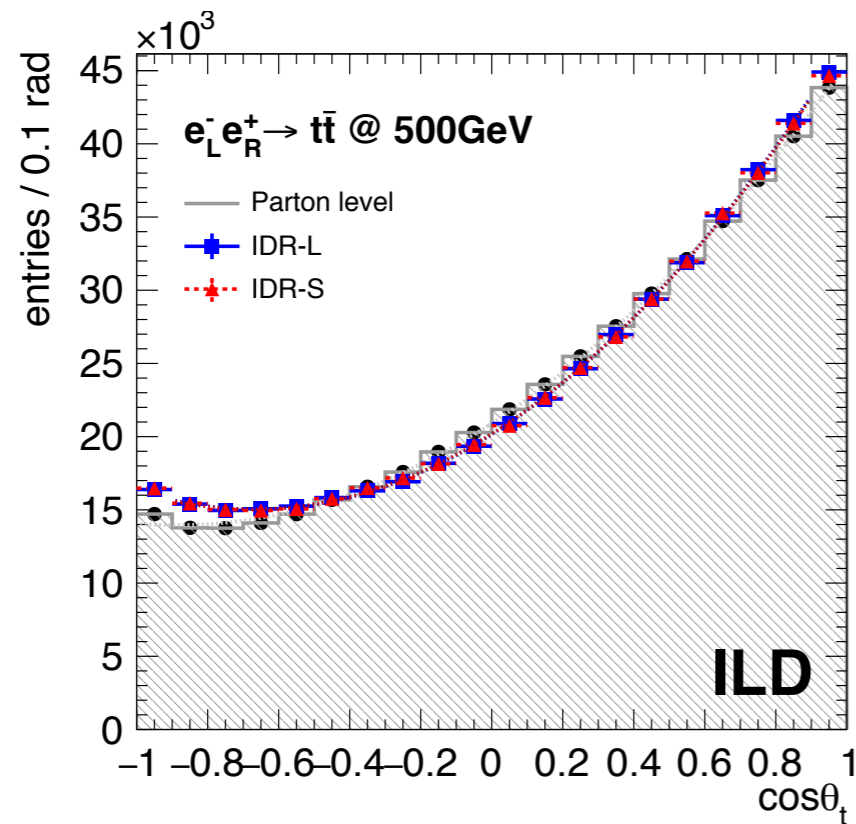
Chi2<15 & IsoLep



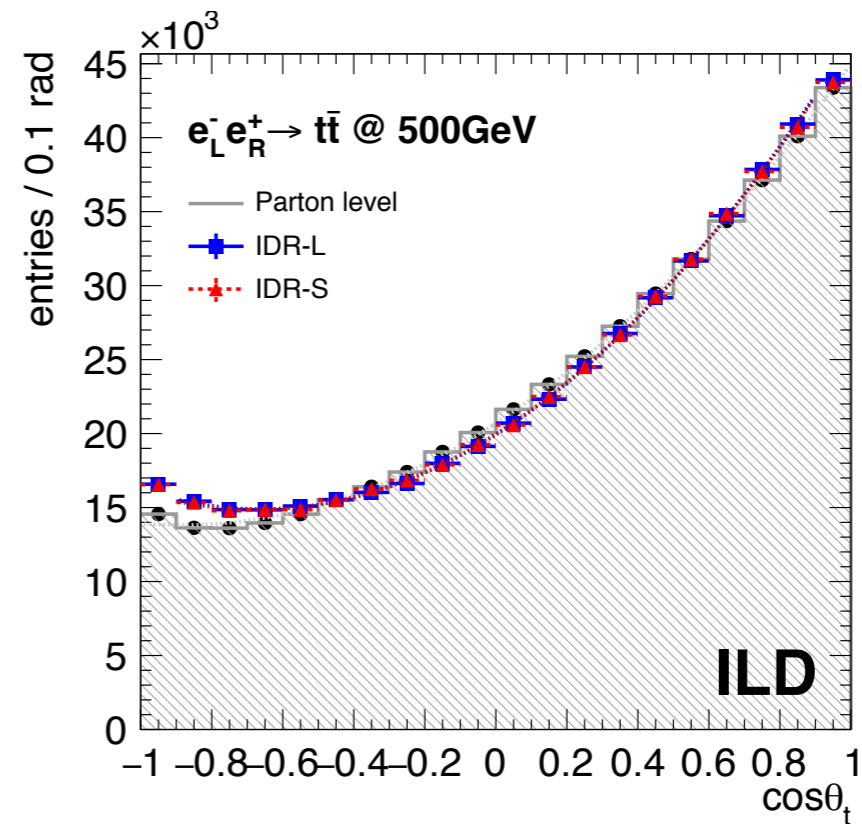
No Chi2 & IsoLep

*corrected **b momentum** from GetHadronMomentum()
to GetB()->getMomentum().

Chi2 and Methods



Chi2<15 & All Methods



Chi2<15 & Method567

*corrected **b momentum** from `GetHadronMomentum()` to `GetB()->getMomentum()`.

Efficiency

Chi2<15 & IsoLep

```
===== Baseline Cuts =====
nEvents = 936261 (100%)
after lepton cuts = 862018 (92.0703%)
after btag cuts (0.8 & 0.3) = 760275 (81.2033%)
after thrust cut = 760275 (81.2033%)
after hadronic mass cut = 732110 (78.1951%)
after reco T & W mass cut = 687268 (73.4056%)
===== Non-baseline Cuts =====
after gcut = 564015 (60.2412%)
after pcut = 685022 (73.1657%)

recoforward = 223038
recobackward = 108078

-----
Afb gen: 0.32871 N: 1812436
Afb reco: 0.34719 N: 331116(105.622%)

-----
Final efficiency: 36.5382%
```

NoChi2 & IsoLep

```
===== Baseline Cuts =====
nEvents = 936261 (100%)
after lepton cuts = 862018 (92.0703%)
after btag cuts (0.8 & 0.3) = 760275 (81.2033%)
after thrust cut = 760275 (81.2033%)
after hadronic mass cut = 732110 (78.1951%)
after reco T & W mass cut = 687268 (73.4056%)
===== Non-baseline Cuts =====
after gcut = 564015 (60.2412%)
after pcut = 685022 (73.1657%)

recoforward = 359130
recobackward = 203530

-----
Afb gen: 0.32871 N: 1812436
Afb reco: 0.276544 N: 562660(84.1299%)

-----
Final efficiency: 62.0888%
```

Chi2<15 & All Methods

```
===== Baseline Cuts =====
nEvents = 906218 (100%)
after lepton cuts = 862018 (95.1226%)
after btag cuts (0.8 & 0.3) = 760275 (83.8954%)
after thrust cut = 760275 (83.8954%)
after hadronic mass cut = 732110 (80.7874%)
after reco T & W mass cut = 687268 (75.8391%)
===== Non-baseline Cuts =====
after gcut = 564015 (62.2383%)
after pcut = 685022 (75.5913%)

recoforward = 316176
recobackward = 163658

-----
Afb gen: 0.32871 N: 1812436
Afb reco: 0.317856 N: 479834(96.6979%)

-----
Final efficiency: 52.9491%
```

Chi2<15 & Method567

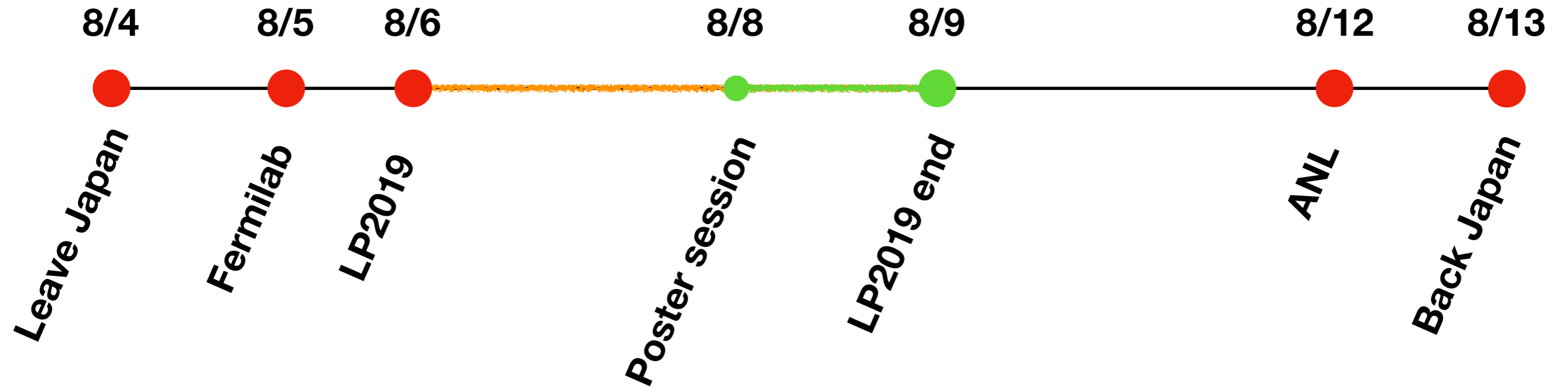
```
===== Baseline Cuts =====
nEvents = 906218 (100%)
after lepton cuts = 862018 (95.1226%)
after btag cuts (0.8 & 0.3) = 760275 (83.8954%)
after thrust cut = 760275 (83.8954%)
after hadronic mass cut = 732110 (80.7874%)
after reco T & W mass cut = 687268 (75.8391%)
===== Non-baseline Cuts =====
after gcut = 564015 (62.2383%)
after pcut = 685022 (75.5913%)

recoforward = 312533
recobackward = 162129

-----
Afb gen: 0.32871 N: 1812436
Afb reco: 0.316865 N: 474662(96.3966%)

-----
Final efficiency: 52.3783%
```


Schedule



First Print: 7/29
Second Print: 7/31