# *TAU Triggers Validation - update -*

**Max Chertok, Teruki Kamon, Takashi Ogawa, Alexei Safonov**

**for *lepton-track trigger* group**

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# *Previous Study*

- **ELECTRON8_TRACK5_ISO trigger efficiency study**
- **Dataset : ELECTRON_CENTRAL_4**
- **The origins of "inefficiency"**

  **→ track quality ( large eta, d0… ) for Iso. Track side**

  **→ L1/L2 inefficiency (almost from L1)**

# e+track Triggers Path

- **ELECTRON8_TRACK5_ISO (EL8TRK5)**
  - **Level 1: Et > 8 GeV, Pt > 8 GeV/c**
  - **Level 2: Same as L1**
  - **Level 3: Et > 8 GeV, Pt > 8 GeV/c,**

    **$|\Delta z| < 8.0$ cm, $\chi$ 2strip < 20**

    **( and Iso. Track Cut )**

# Back-up Triggers -1-

- **ELECTRON_CENTRAL_4 (ELE4)**
  - **Level 1: Et > 4 GeV, Pt > 4 GeV/c**
  - **Level 2: Auto**
  - **Level 3: Et > 4 GeV, Pt > 4 GeV/c,**

    **HAD/EM < 0.125, Lshr < 0.2,**

    **$|\Delta z| < 5.0$ cm, $|\Delta x| < 3.0$ cm,**

    **$\chi^2_{strip} < 10$, $\chi^2_{wire} < 15$**

***This trigger have tighter cuts for electron than comparative trigger at L3!!***

# Back-up Triggers -2-

- **ELECTRON_CENTRAL_L3PS20_L1_CEM8_PT8 (CEM8_PS20)**
  - **Level 1: Et > 8 GeV, Pt > 8 GeV/c**
  - **Level 2: Auto**
  - **Level 3: Only PreScale**

***This back-up trigger should be used for e+track study at L2 and L3.***
***In this talk we use CEM8_PS20 data.***

# Definition of efficiency

① **Select events with back-up path bit**

**e.g. CEL4, CEM8_PS20**

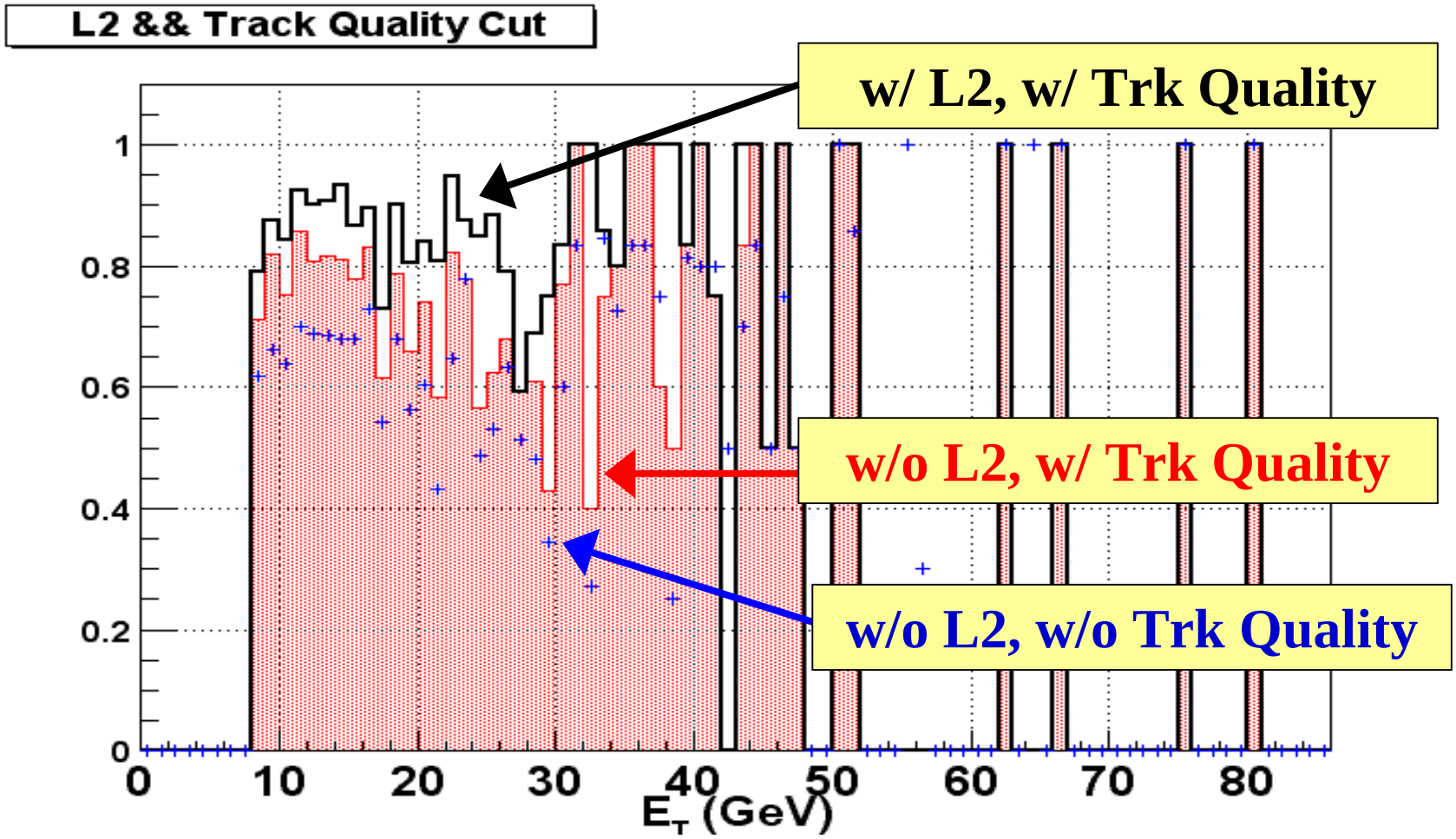
② **Apply offline cuts**

③ **Check EL8TRK5 bit after cut**

***We define***

**Eff. =** (①&②&③)/(①&②)

# Offline cuts imitating L3




**Track Quality : |eta| < 1.0, |d0| < 2.0, COT hits > 50 in offline**

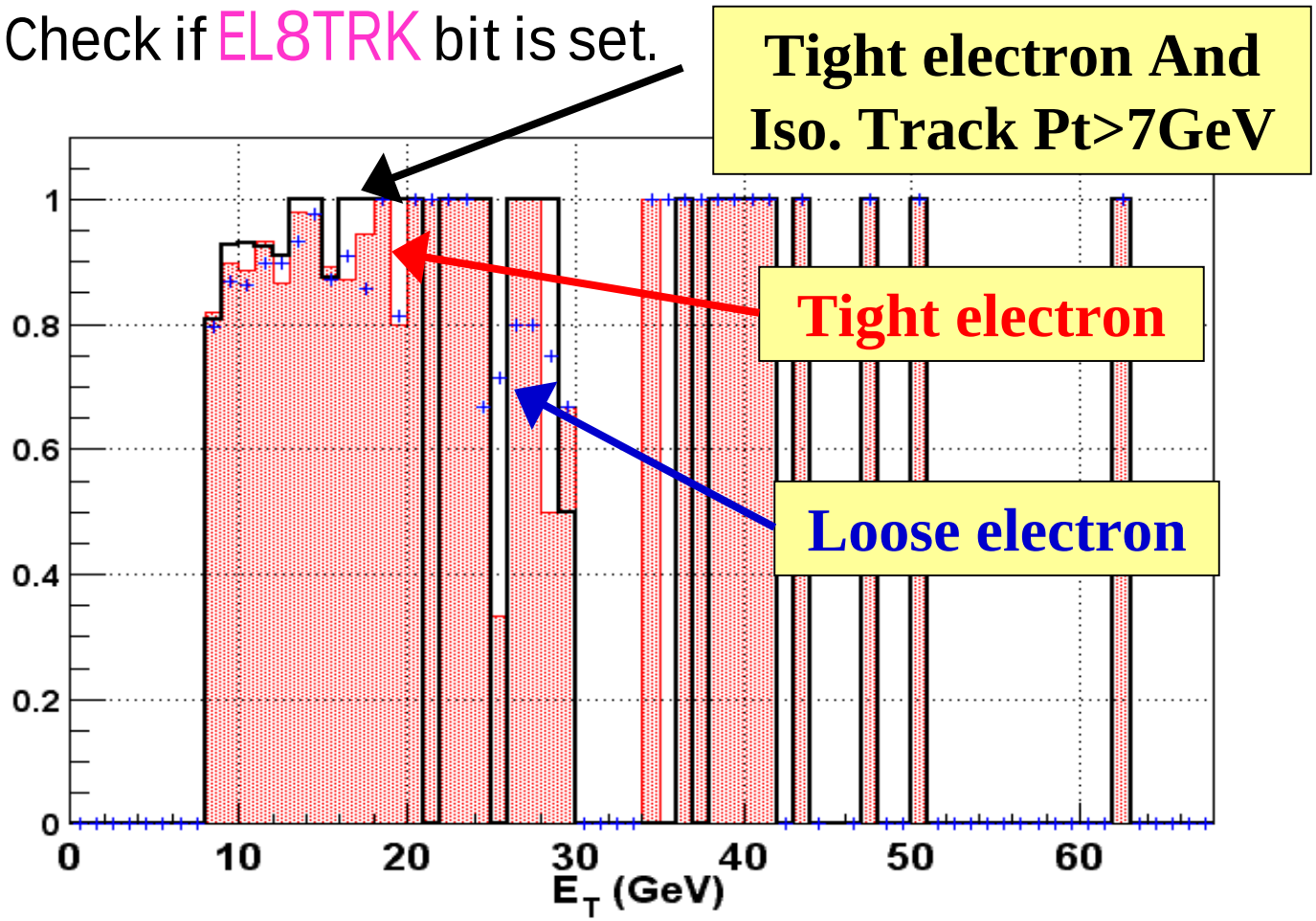
# Efficiency Study for Good Electron

- *Tight electron*
  - Et > 8 GeV
  - Pt > 8GeV/c
  - Had/EM < 0.05
  - 0.5 < E/P < 2.0
  - $|\Delta Z| < 3.0$cm
  - $|\Delta X| < 1.5$cm
  - $\chi^2$strip < 20
  - Lshr < 0.2

- *Loose electron*
  - Et > 8GeV
  - Pt > 8GeV/c
  - Had/EM < 0.1
  - 0.5 < E/P < 2.0
  - $|\Delta Z| < 5.0$cm
  - $|\Delta X| < 3.0$cm
  - $\chi^2$strip < 20

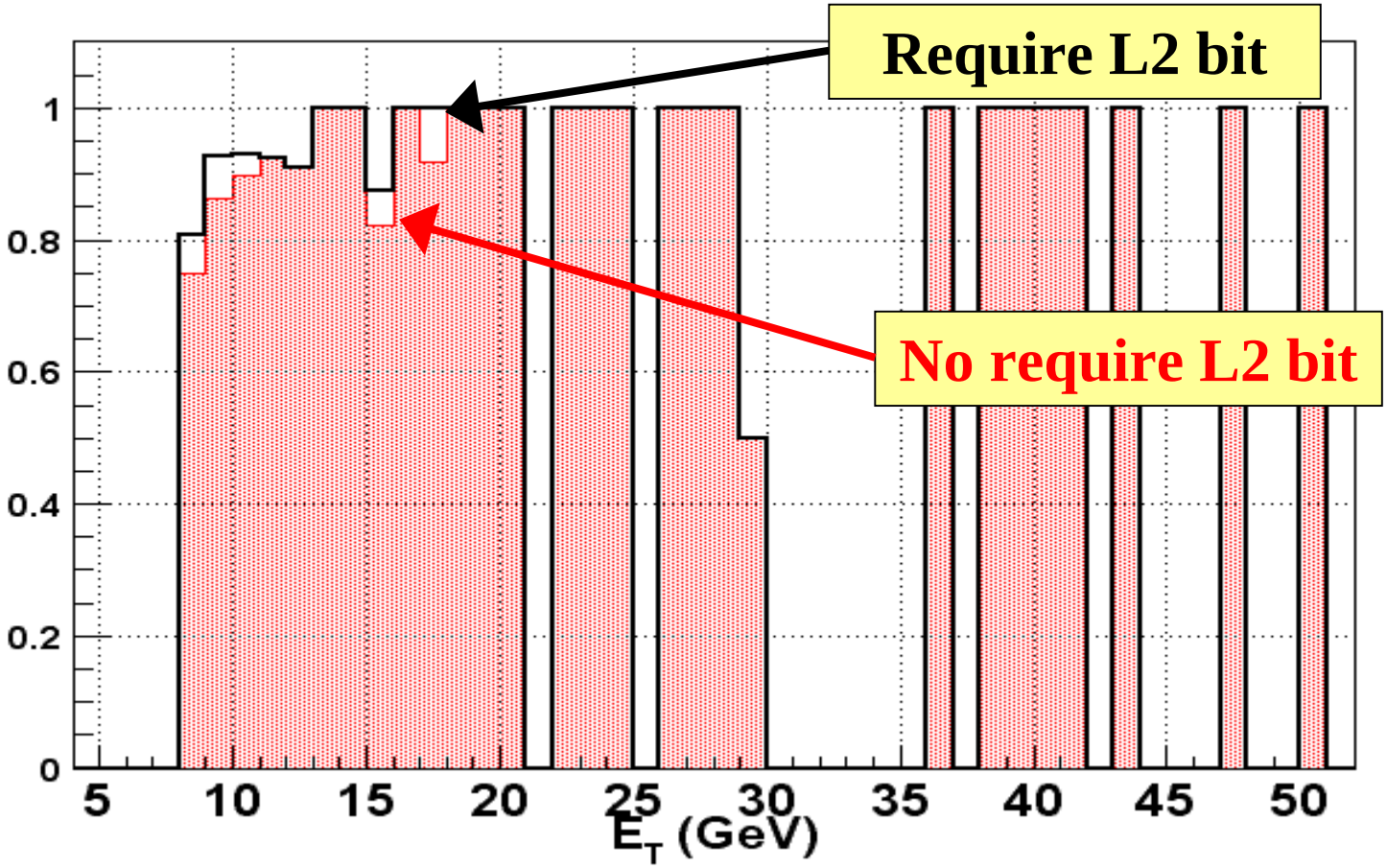
# L3 efficiency with good electron

- Select events with "standard" tight/loose electrons and Qualified Iso. Track after L2 bit requirement.
- Check if EL8TRK bit is set.



# efficiency with/without L2

- Select events with “standard” tight electron and Qualified Iso. Track (Pt>7GeV/c).



# Conclusions

- Events with tight electron is close to 100% efficiency in plateau.
- However it is not 100%.
- It may come from Iso. Track side.
- L2 causes little inefficiency.
- Plan
  - Iso. Track side study.
  - New trigger table (v8) study , including CES at L2.