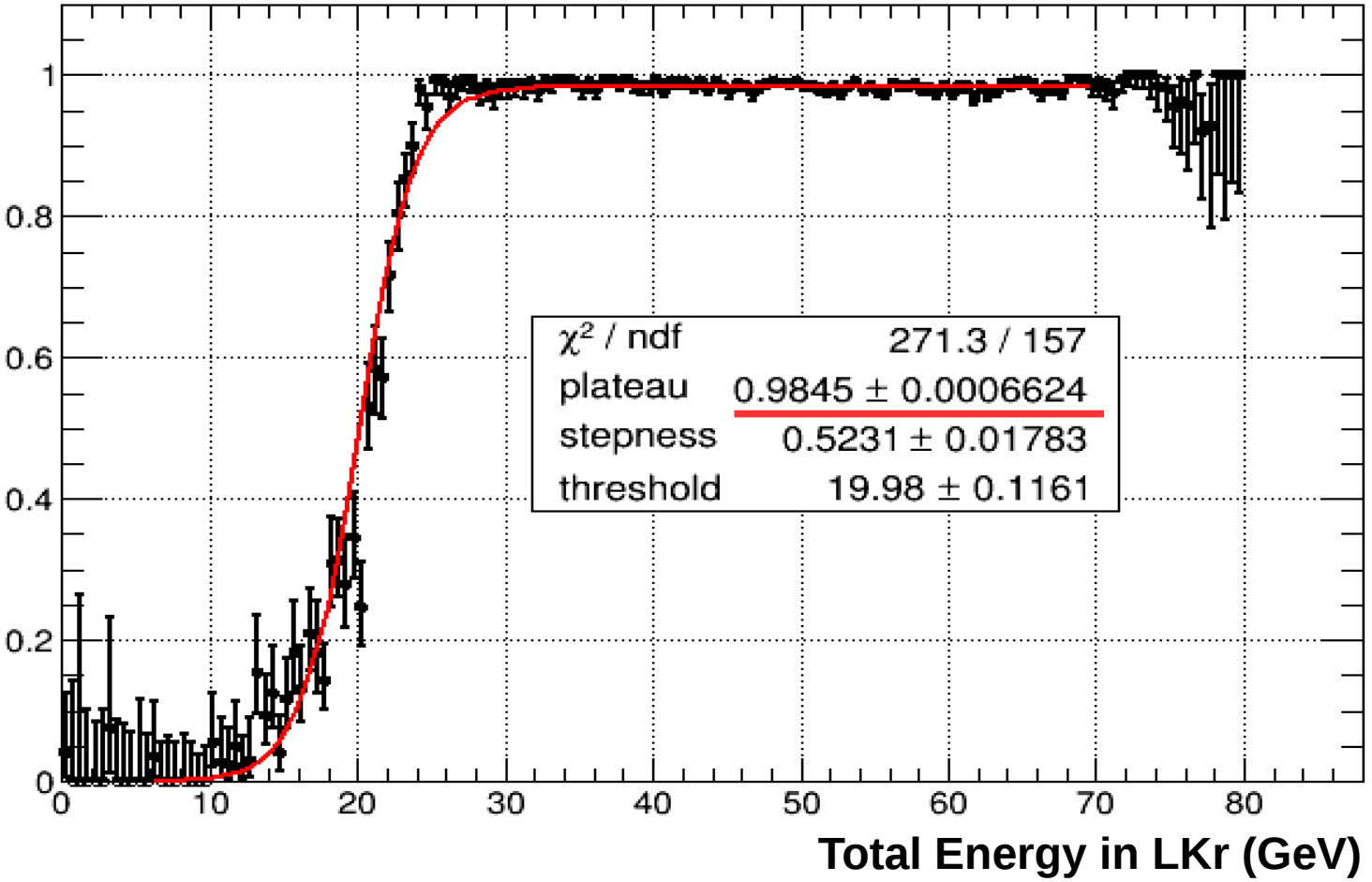
Updates on calorimetric trigger timing

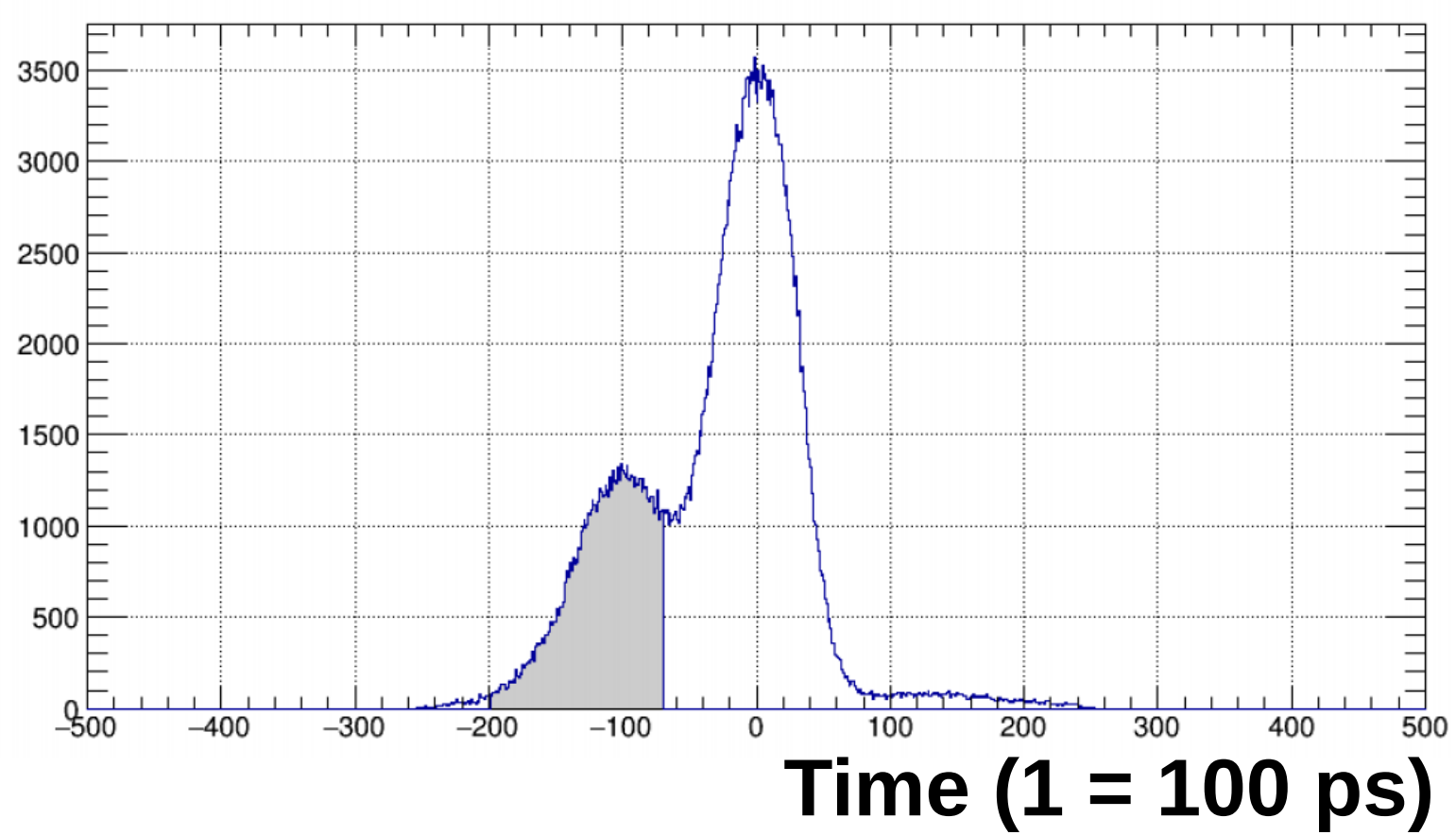
Nico De Simone for the
L0Calo working group

$\pi^+\pi^0$ LKr Efficiency



Ctrl trigger time – Calo trigger time

- | Δ t | < ± 20 ns → Eff = 99 %
- | Δ t | < ± 10 ns → Eff = 88 %



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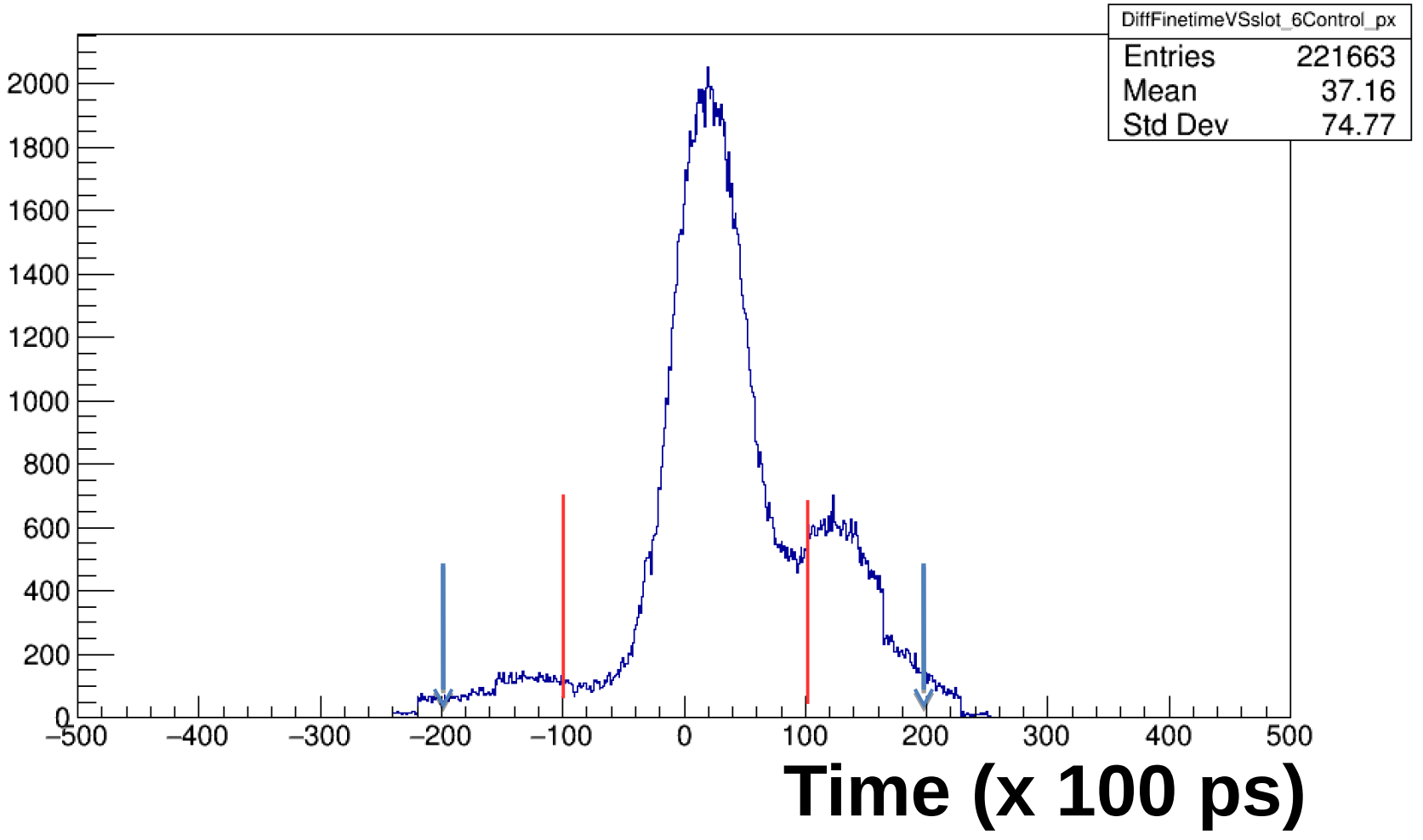
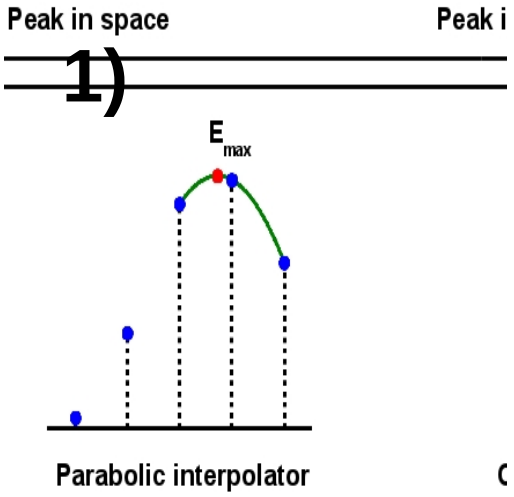
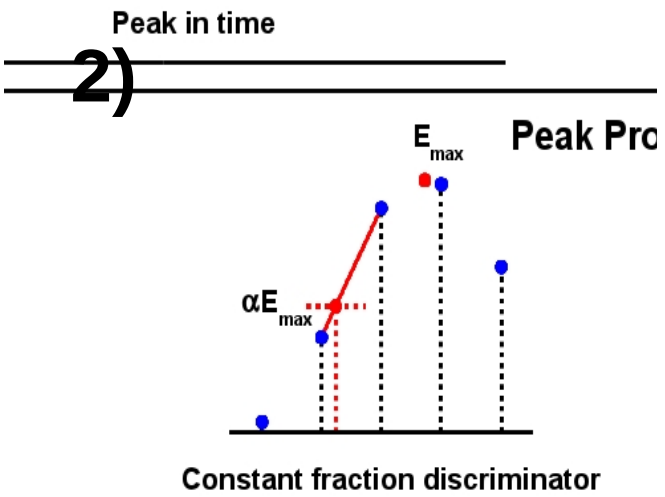
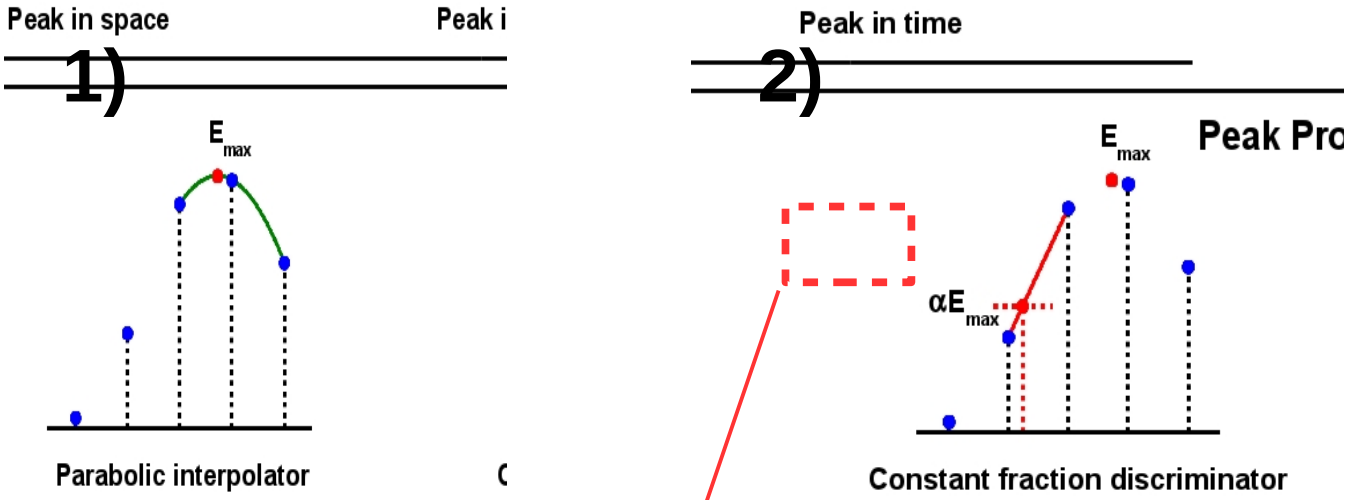


Finetime Finder Logic



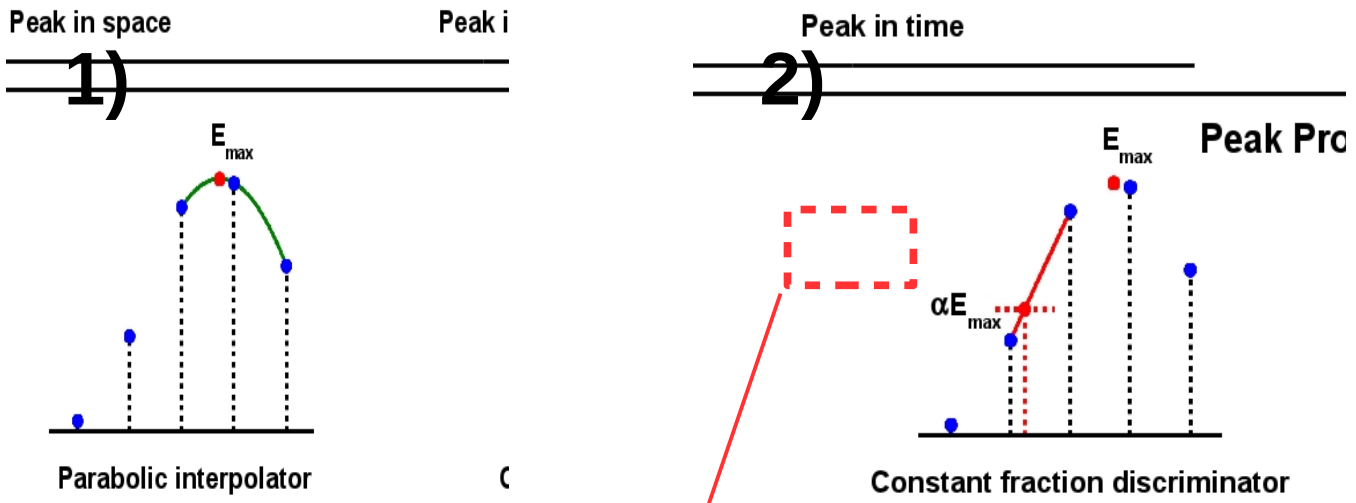


Finetime Finder Logic




```
entity finetime_finder_bisec is
  port (
    clk, rst                : in  std_ulogic;
    sample_lo, sample_hi    : in  tile_t;
    finetime_y              : in  ufixed(7 downto -7);
    rdy                     : in  std_ulogic;
    finetime                : out unsigned(7 downto 0);
    done                    : out std_ulogic
    );
end finetime_finder_bisec;
```

Finetime Finder Logic

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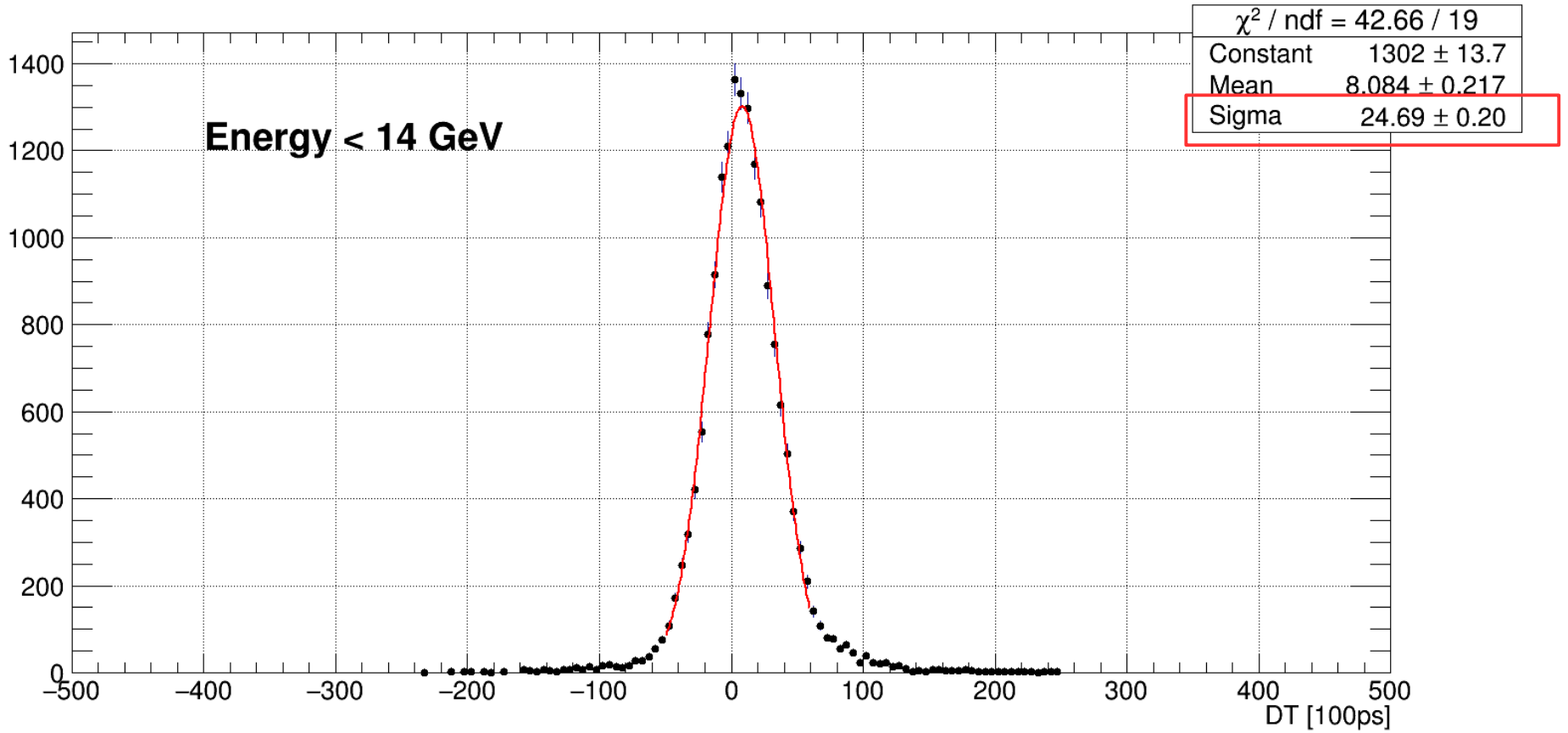
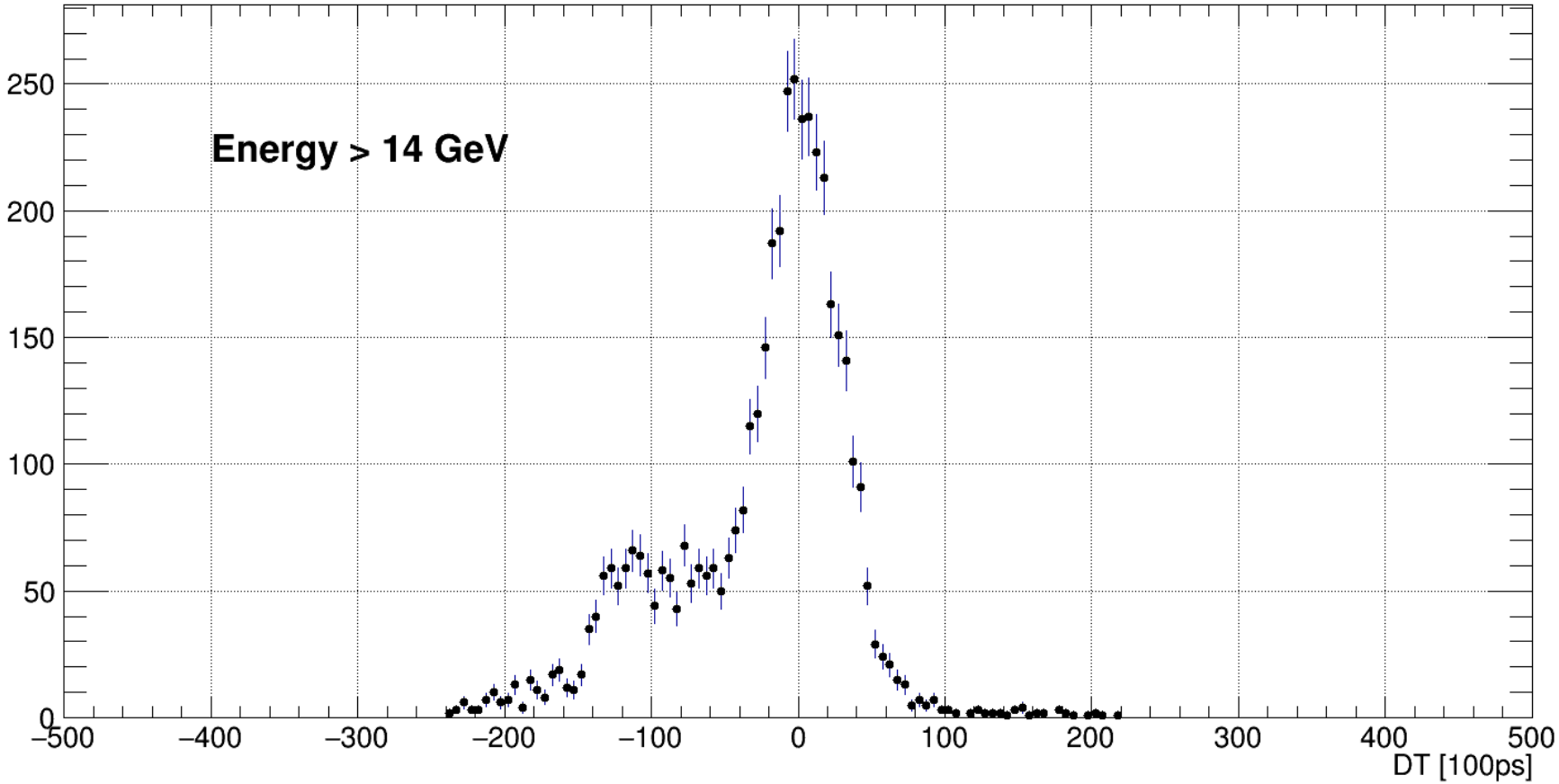
```

- **Saturation at 2^8 x 56 MeV = 14 GeV**
- **Not an issue in 2015 (8b encoding from CREAMs)**
- **Became an issue in 2016 (12b encoding from CREAMs)**
- **It only affects the finetime of the peak (timestamp, energy are ok)**

Ctrl trigger time – Calo trigger time



Ctrl trigger time – Calo trigger time



Thanks

$\pi^+\pi^0$ Selection

- Minimum Bias (chod) + mask0 (RICHxNewCHODx!MUV3)
- QualityMask=0 (to exclude events in which L0TP sent corrupted data)
- Good Tracks:
  - $\chi^2 < 20$;
  - 4 chambers hit;
  - GTK not used;
  - cda with nominal kaon direction 40 mm;
  - Cedar > 4 sectors hit;
  - Cedar – Track time < 2 ns;
  - Vertex 130 m < Z < 175 m;
  - CHANTI as veto.
- Pion selection:
  - P track < 70 GeV;
  - [missing mass (K^+ - π^+)]^2= π^0mass^2 ± 0.01;
  - No MUV3 candidates in time;
  - No LAV candidates in time;

All the efficiencies are taken into account, no requirements on LKr in the selection of the $\pi^+\pi^0$ sample