H2: CMS ECAL

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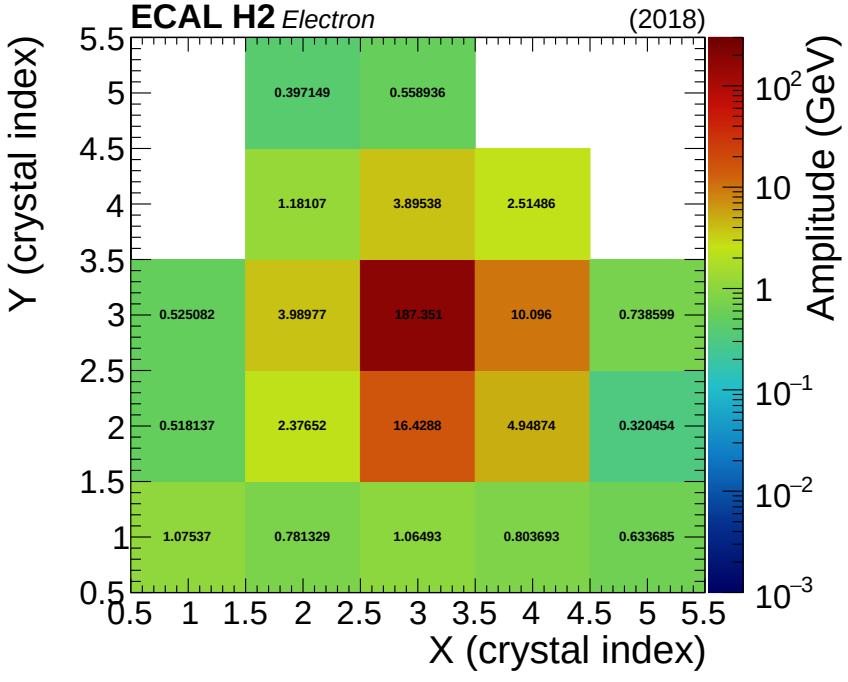
Objective

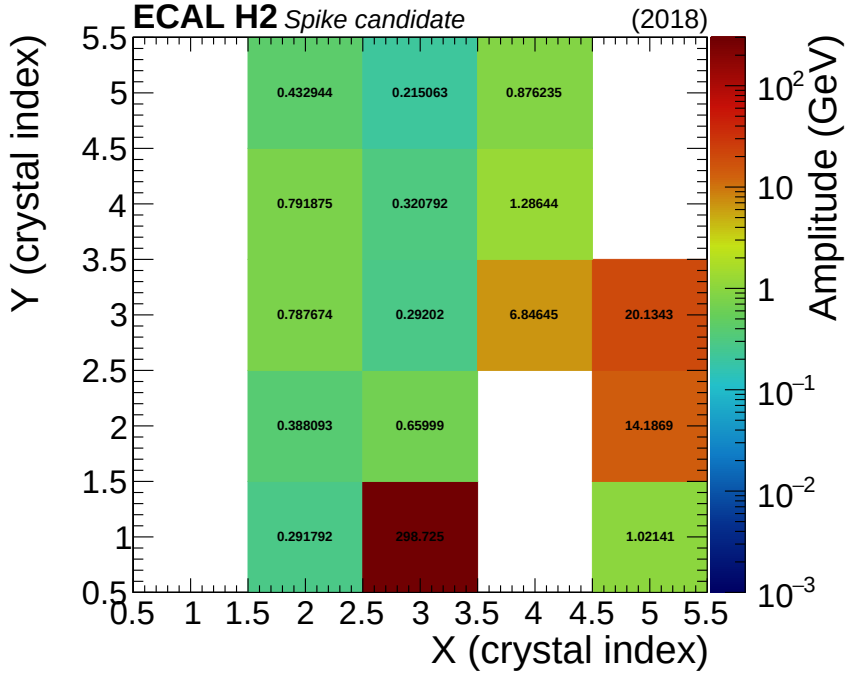
- **Study APD direct ionization from hadrons ("spikes")**
- Spikes suppression crystals for CMS Phase II trigger.
  - ➔ Current spike-rejection is performed online using energy deposit topology in a 5x5 crystal matrix.
  - ➔ Phase II trigger will exploit single crystal information ➔ **improved topology based rejection** and higher ADC sampling frequency ➔ **shape discrimination**.
- **TB ongoing in H2**:
  - ➔ Collect a sample of spike events to study suppression algorithms performances.

Topology based discrimination

H4 (June): electron beam 250 GeV

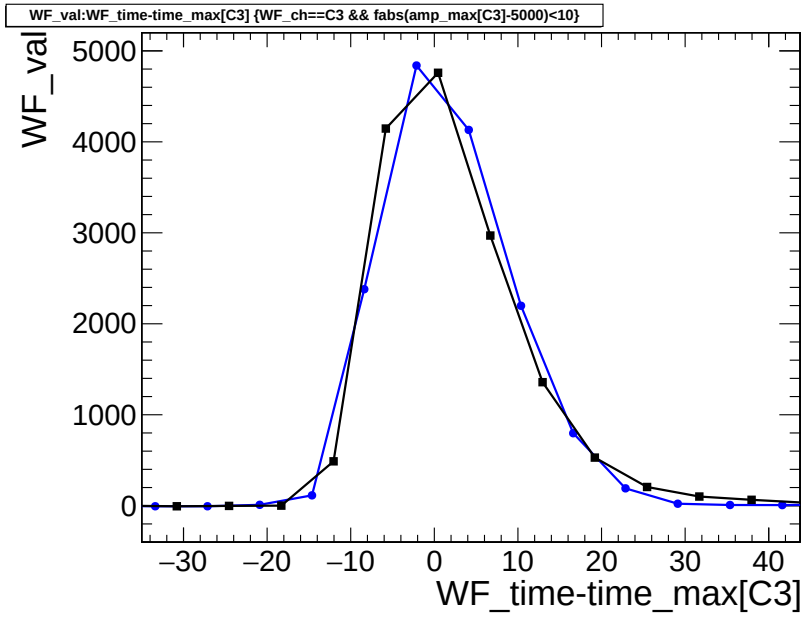


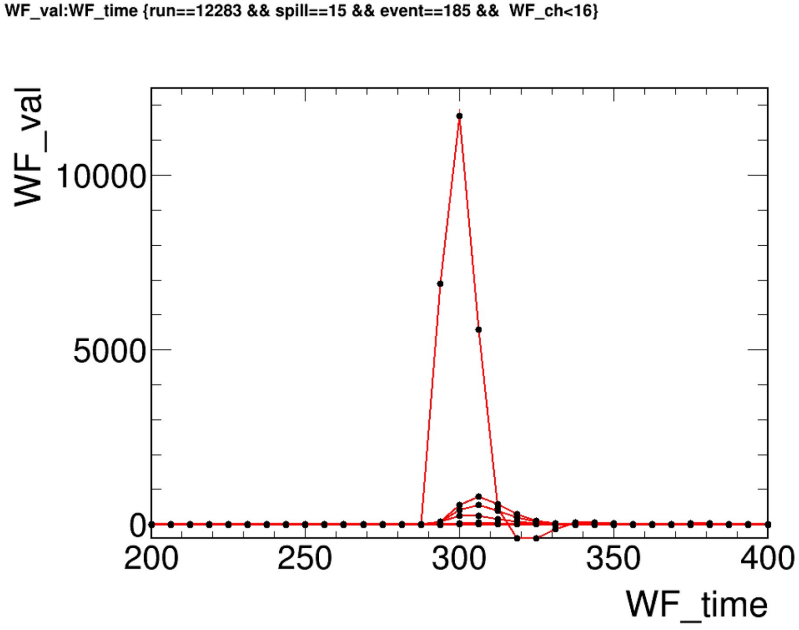
H2 (Sept.): pion beam 120 GeV



Signal shape discrimination

- Exploit faster signal from "spikes" to discriminate between EM shower and direct ionization events.





Summary

- We are taking advantage the 2 weeks left open by CMS HCAL to complement our 2018 TB campaign with pion beam data to study anomalous APD signal.
- **This data will be very useful to the trigger algorithm for HL-LHC.**
- We would like to thank again the SPS team for the excellent beam and in particular Nikos and Bastien for they support.