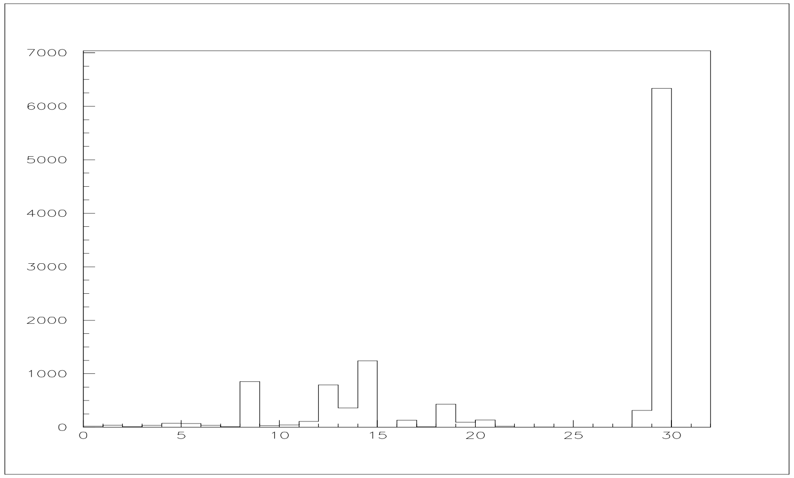
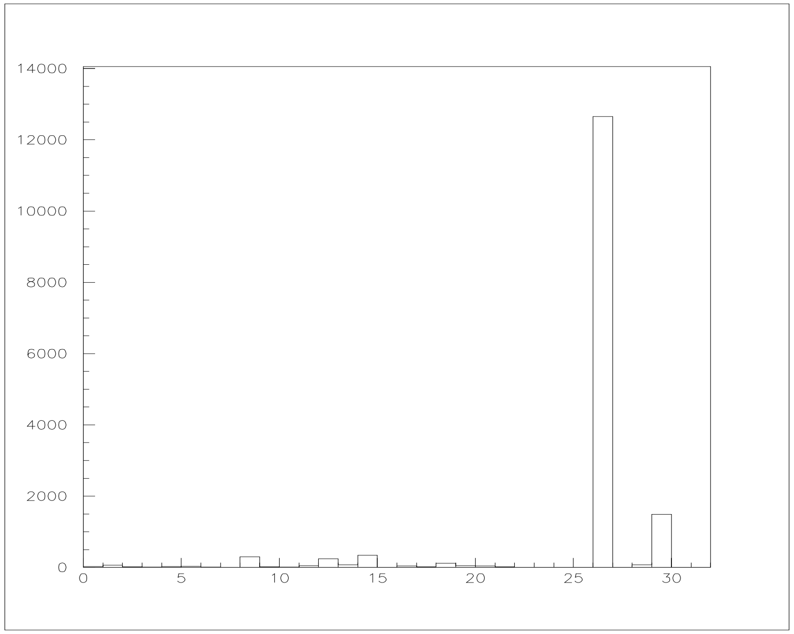
DCH Background versus Beam current

- Improvements since last time:
  - Use of the complete level 1 trigger information
  - Extrapolation of the Number of Digis in the (I_{LER}, I_{HER}) plane
- The bits< 25 are "Physics" triggers, the other are "Background" triggers.
- Single Beam distribution. (Valerie: Bit 30 refers to the additional cyclic rate for BKG runs to get more random crossing)

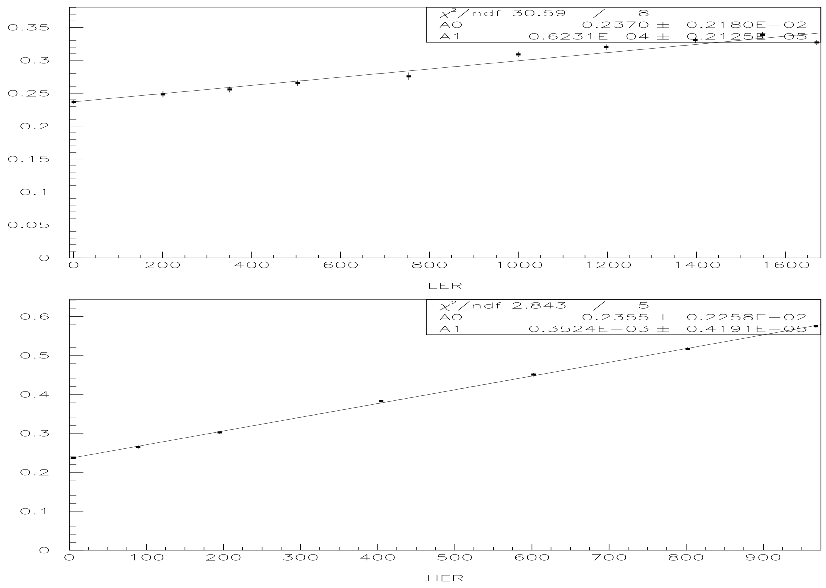


- Some background runs (26014, 26030, 26067, 26068) show a "strange" bit distribution:



- Valerie, Anders: in this period the bunchcrossing trigger (bit 27) was unreliable (different prescaling, bad "Hardware trigger rate", Bunchcrossing replaced by pulse generator,...). This four runs were not used in the following.

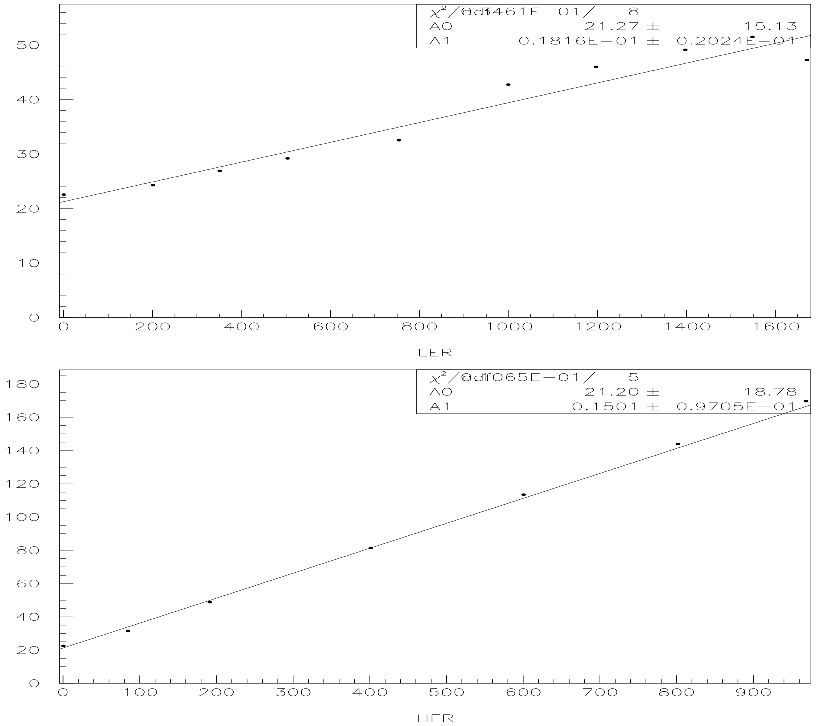
- Up to now we determined the number of digis due to background using only the "background triggers": is it right?
- Answer: no, as the background events often mimic the physics ones. At $I = 0$, the "physics trigger" fraction is due to cosmics.
- Fraction of physics trigger versus the beam current in single beam runs: strong dependence on HER.



DCH Background

Single Beam Results

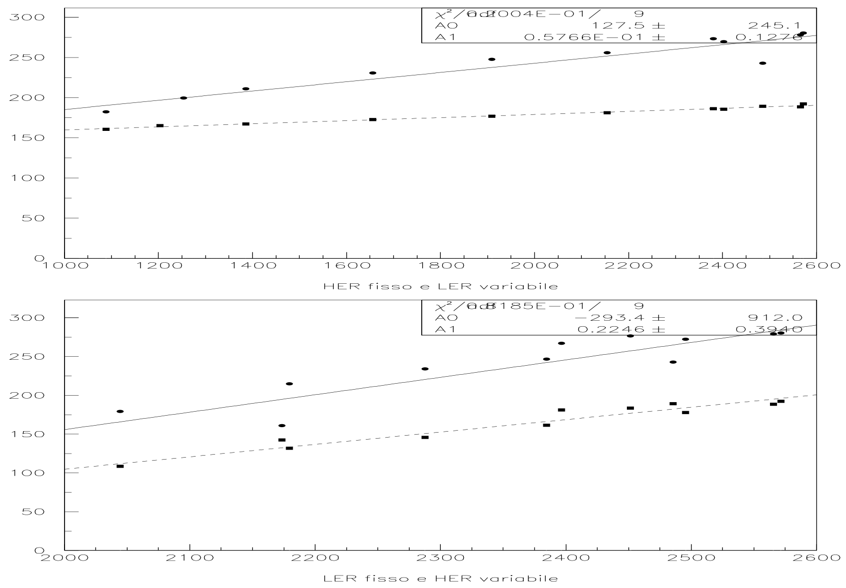
- Average number of digis versus the beam current (single beam, all triggers):



- The number of digis shows a stronger dependence on HER.

Two Beams Results

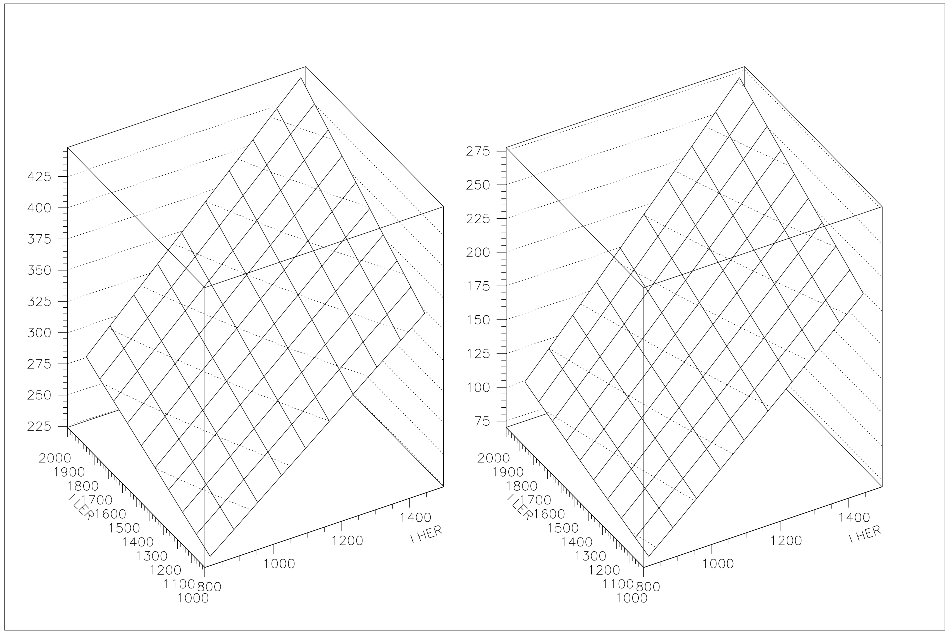
- Average number of digis versus the sum of the two currents:



- Different HER, LER dependence: one current is fixed and the other is varying (Upper: Fixed I_{HER} ~920mA, Lower: Fixed $I_{LER} \sim 1600$ mA).
- Result compared with the extrapolation of the sum of the two single beam contributions (dotted line).

Two Beams Results

- 2-dimensional extrapolation in the I_{HER}, I_{LER} plane:



Two Beams ALL   Two Beams BKG

- Example: for an increase of a factor ~ 2 in the currents $(I_{HER} = 2000mA, I_{LER} = 3400mA)$, N^{DIGI}_{TOTAL}=770,N^{DIGI}_{BKG}=580

- Next Step: MC production with background files.

DCH Background