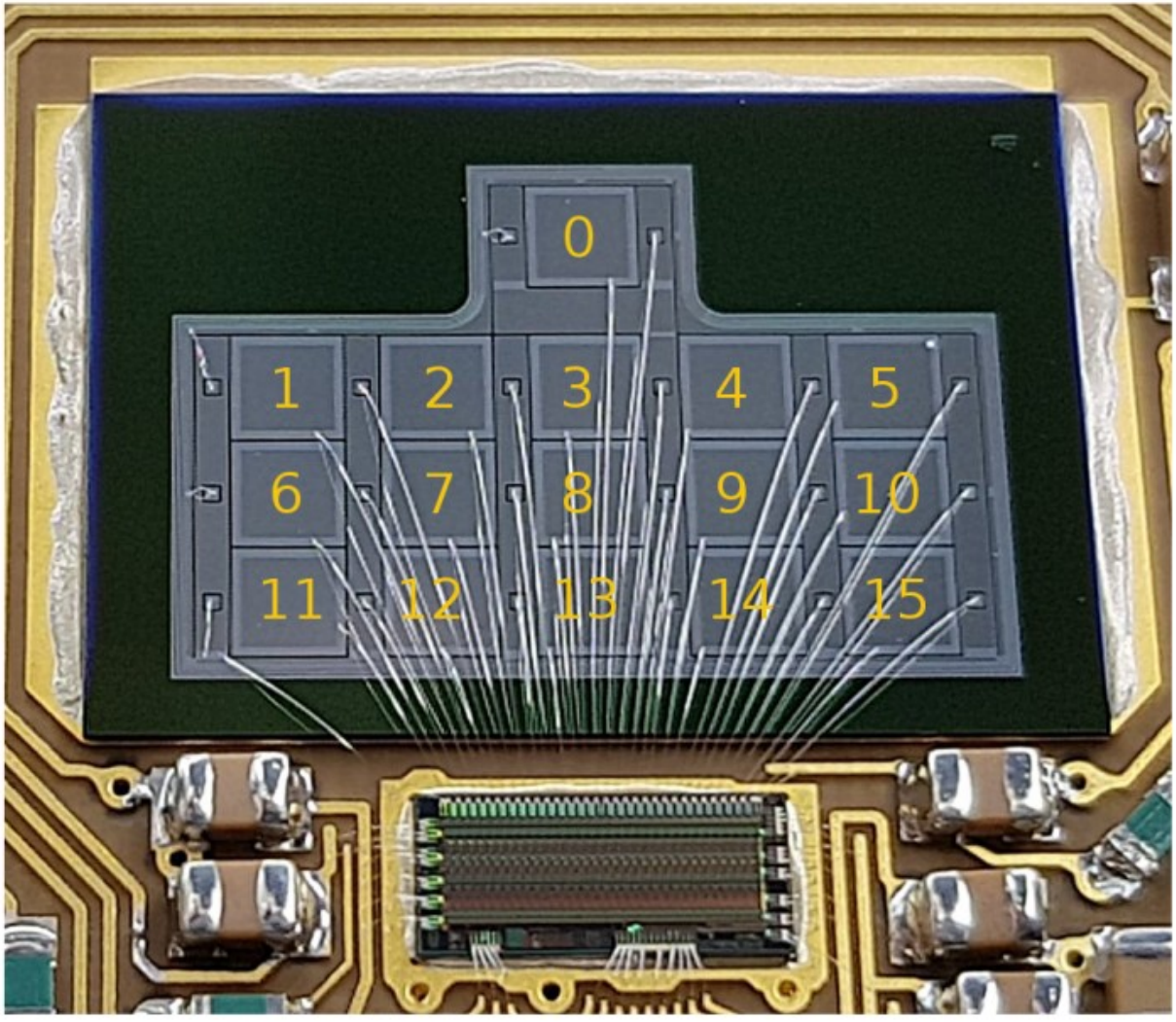
STEP - ASIC IDefX BD

We discovered an issue with some channels(pixels) in the two ASIC IDefX BD‘s used in the SupraThermalElectronProton Instrument onboard SOLarOrbibter.
Pulse Hight Analysis (PHA) data show „ghost“ peaks on several pixels that are linked to precursor events that exceed the nominal energy range of STEP.
It seems that for very energetic events some of the chanels are not at zero after event processing, and instantly trigger again on the declining flank of the event.
To illustrate the problem :

- Expected form of observed spectra (Pages 2,3,4)
- Comparison to conspicuous Pixel (Pages 5,6,7)
- Normalised PHA spectra of all pixels for both heads (Page 8,9)
- Delta times to last processed events (Pages 10,11)
- Spectra for all pixel for delta times < 20 µs and > 20 µs (Pages 12,13)
- Energy spectra of precoursor events (Page 14)
- Spektrum for pixel 1 of head 1 decomposed (Page 15)

STEP - SETUP



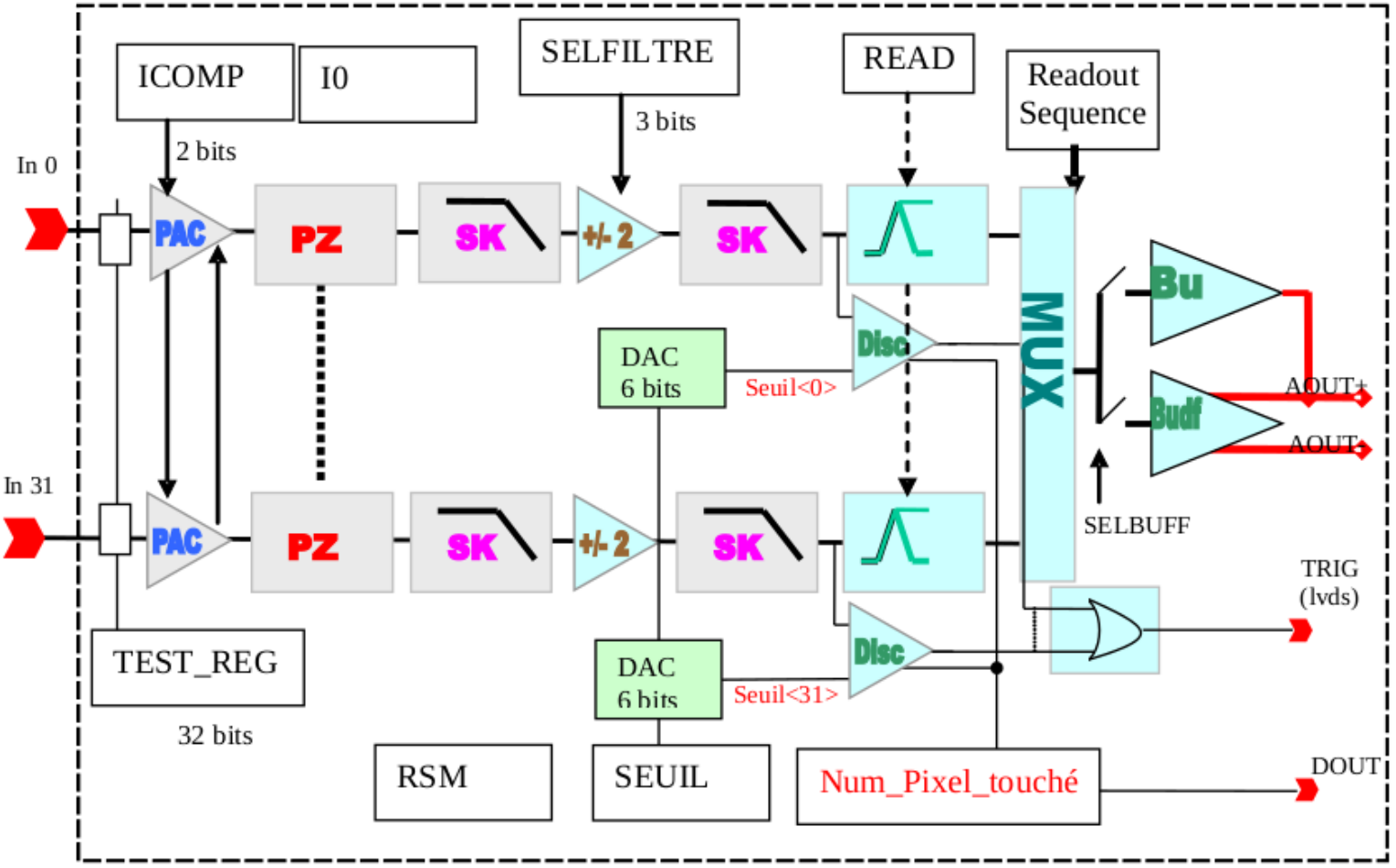
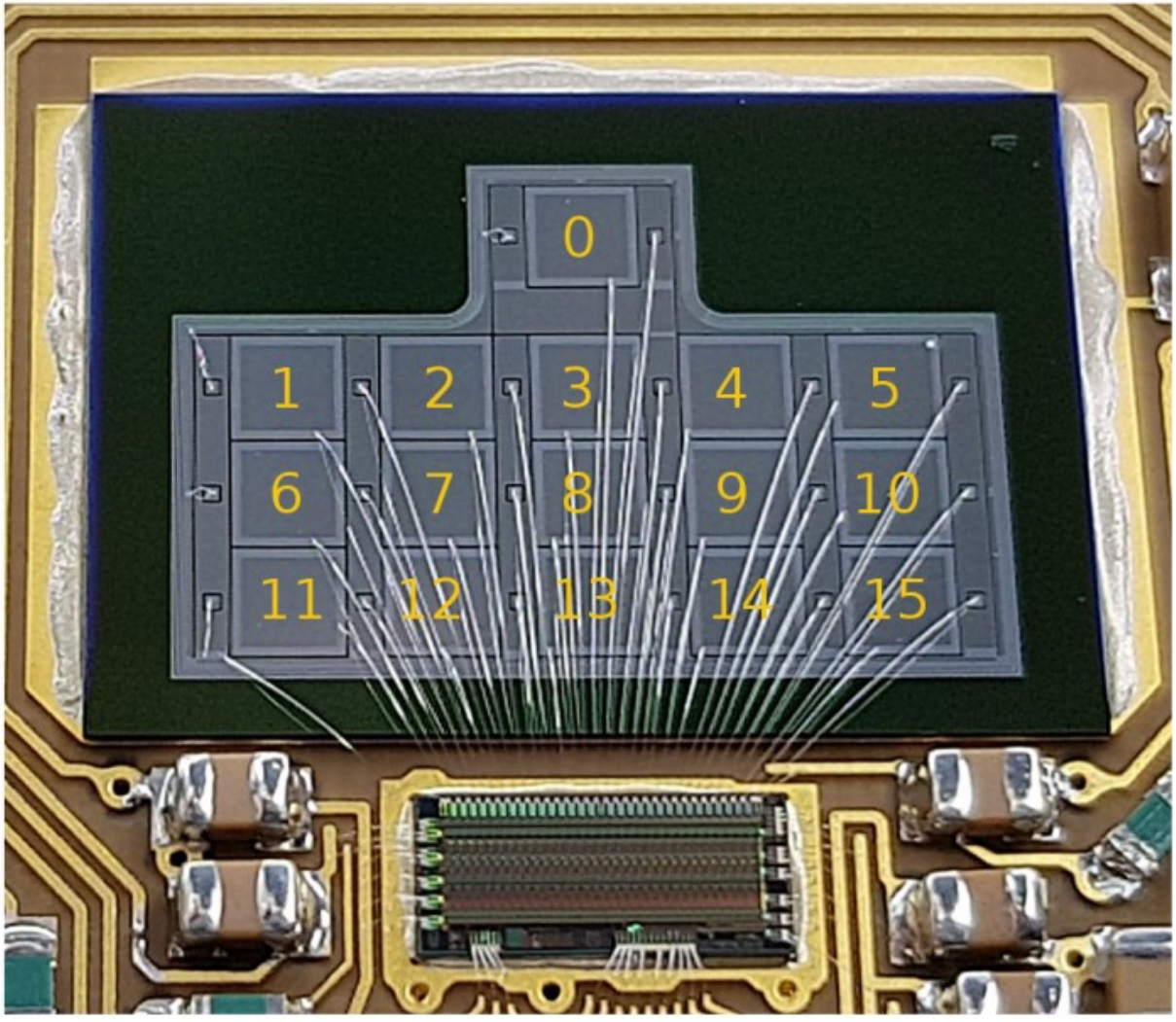
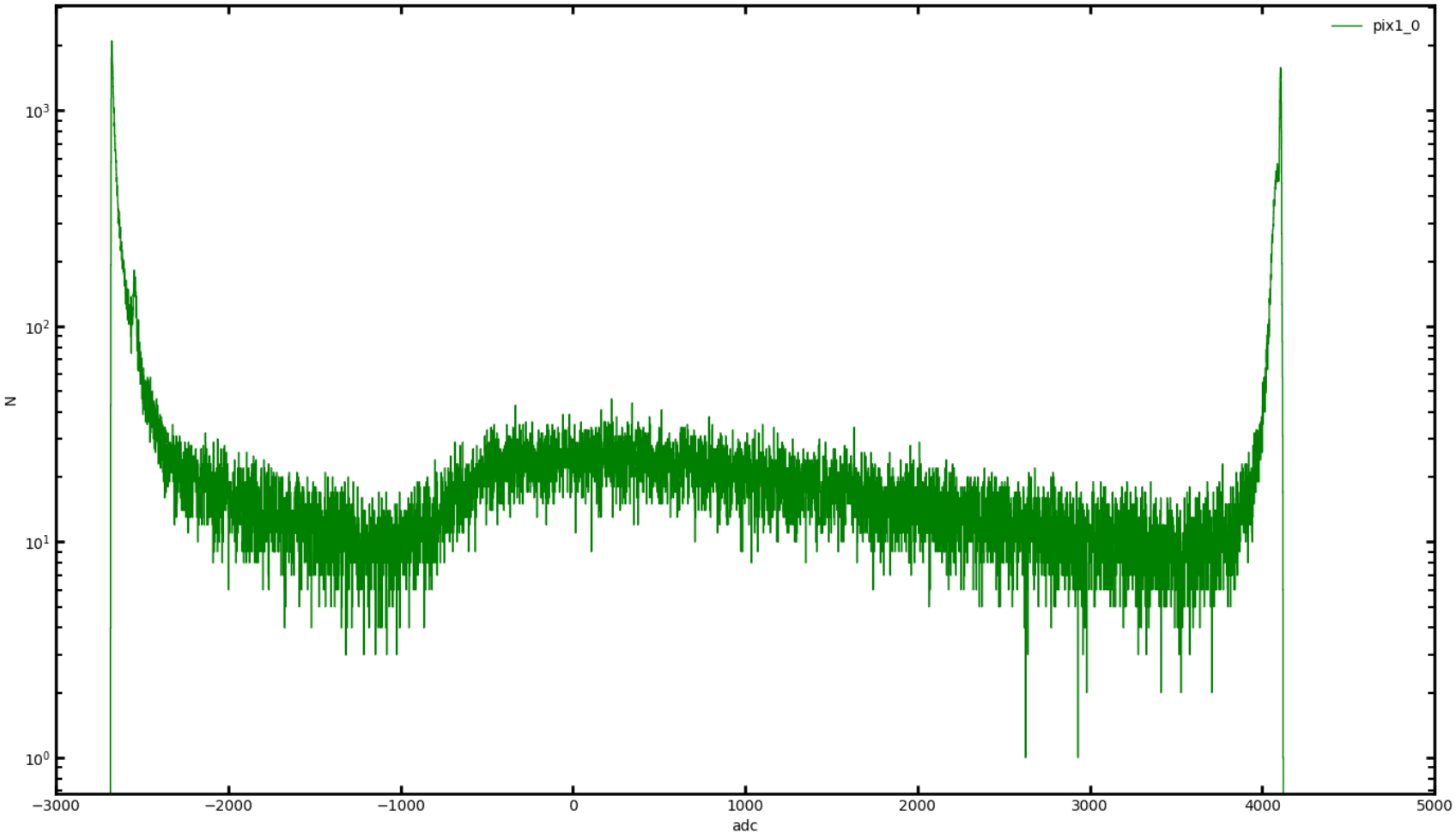


Figure IDefX BD chip block diagram.

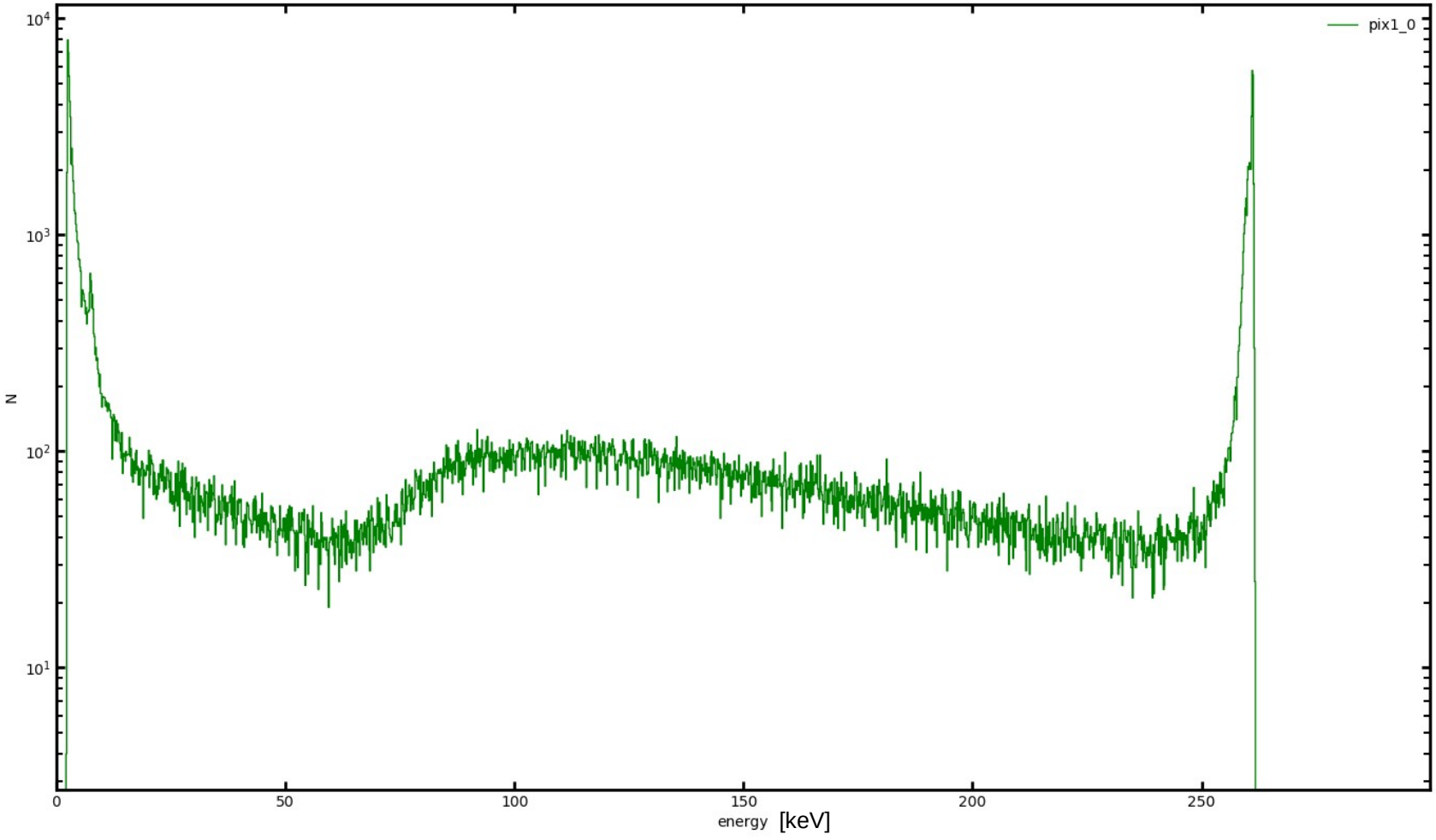
STEP - SETUP



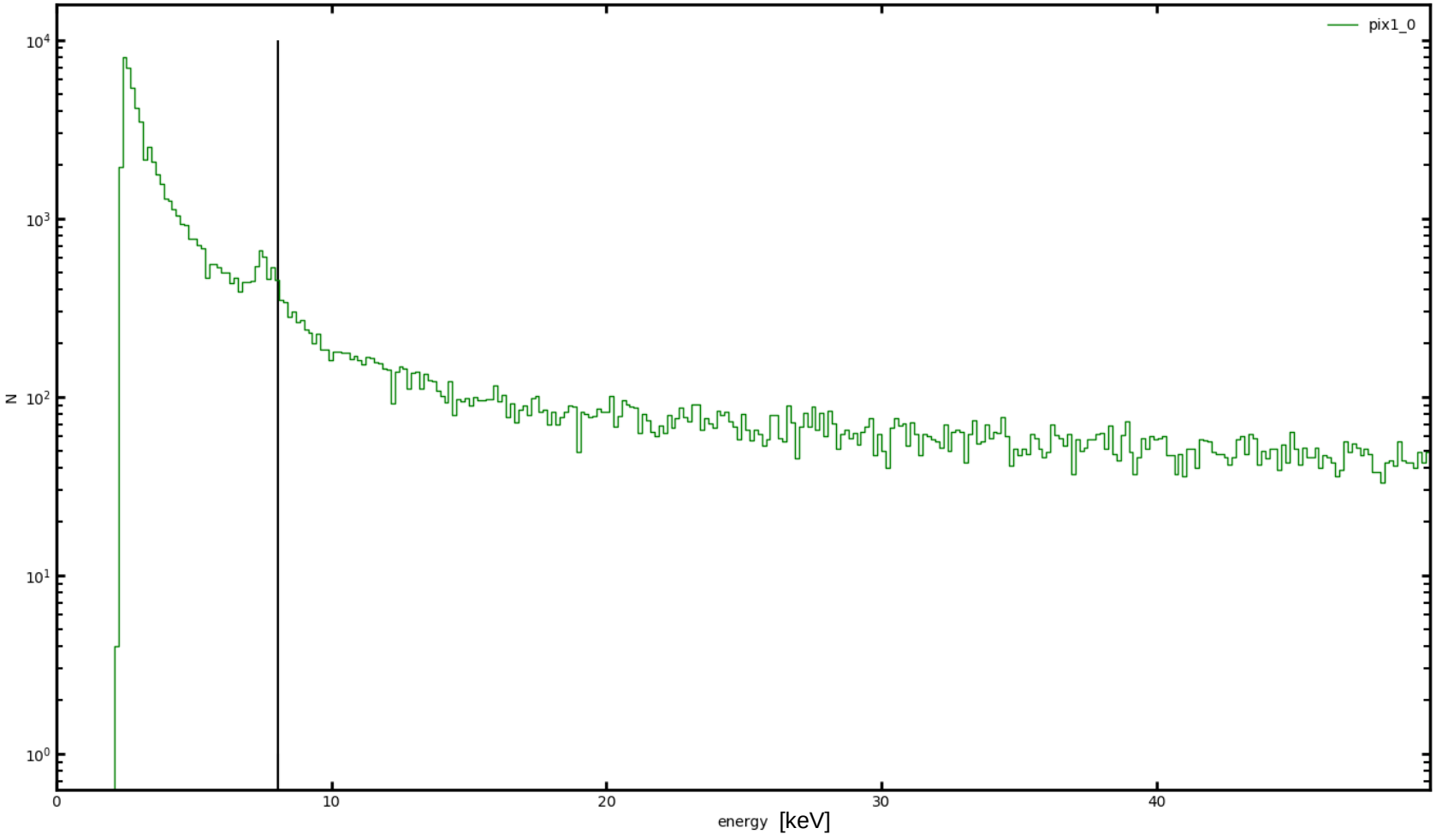
Head 0, Pixel 1 ADC Spectrum



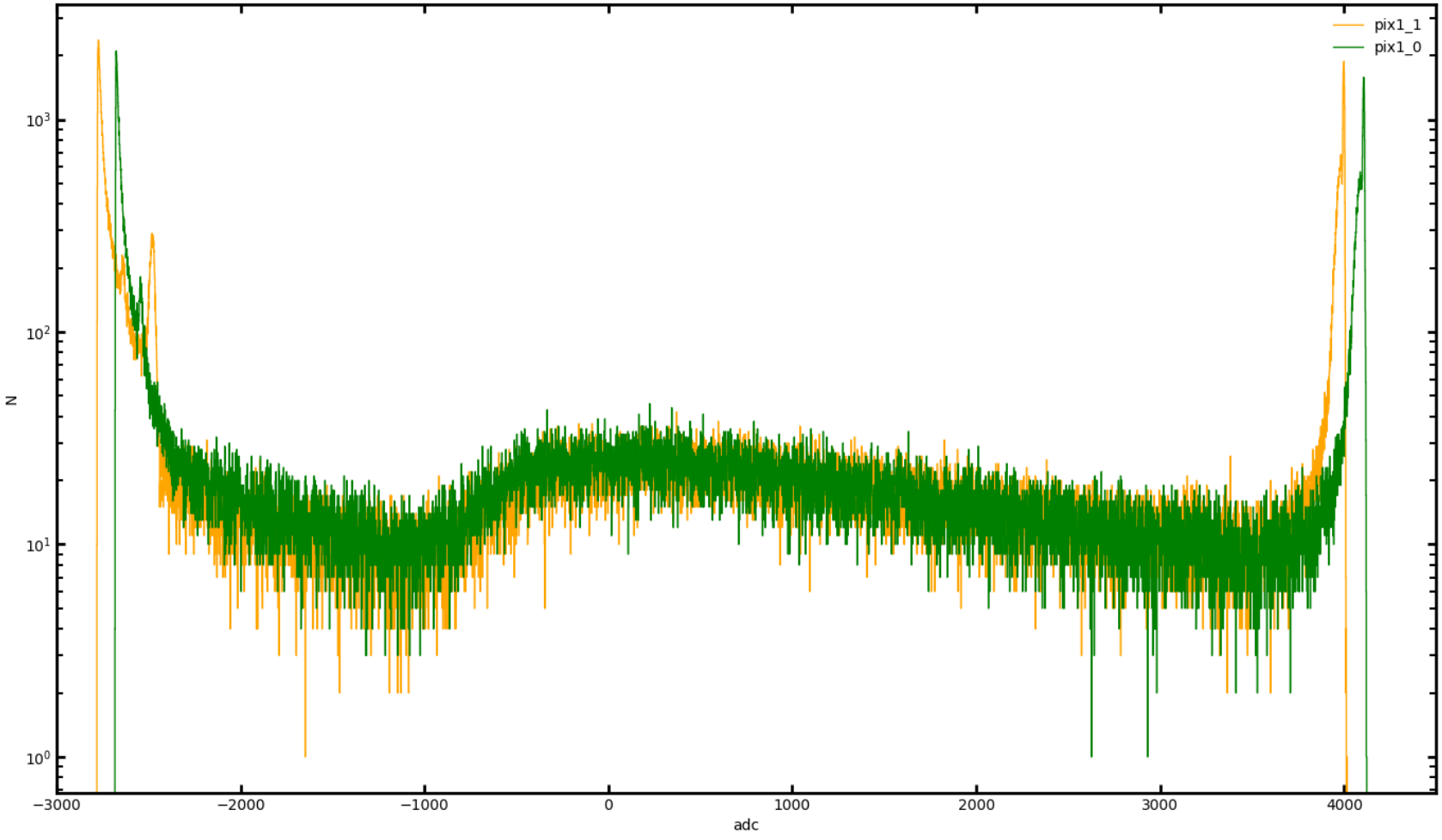
Head 0 Pixel 1 Energy Spectrum



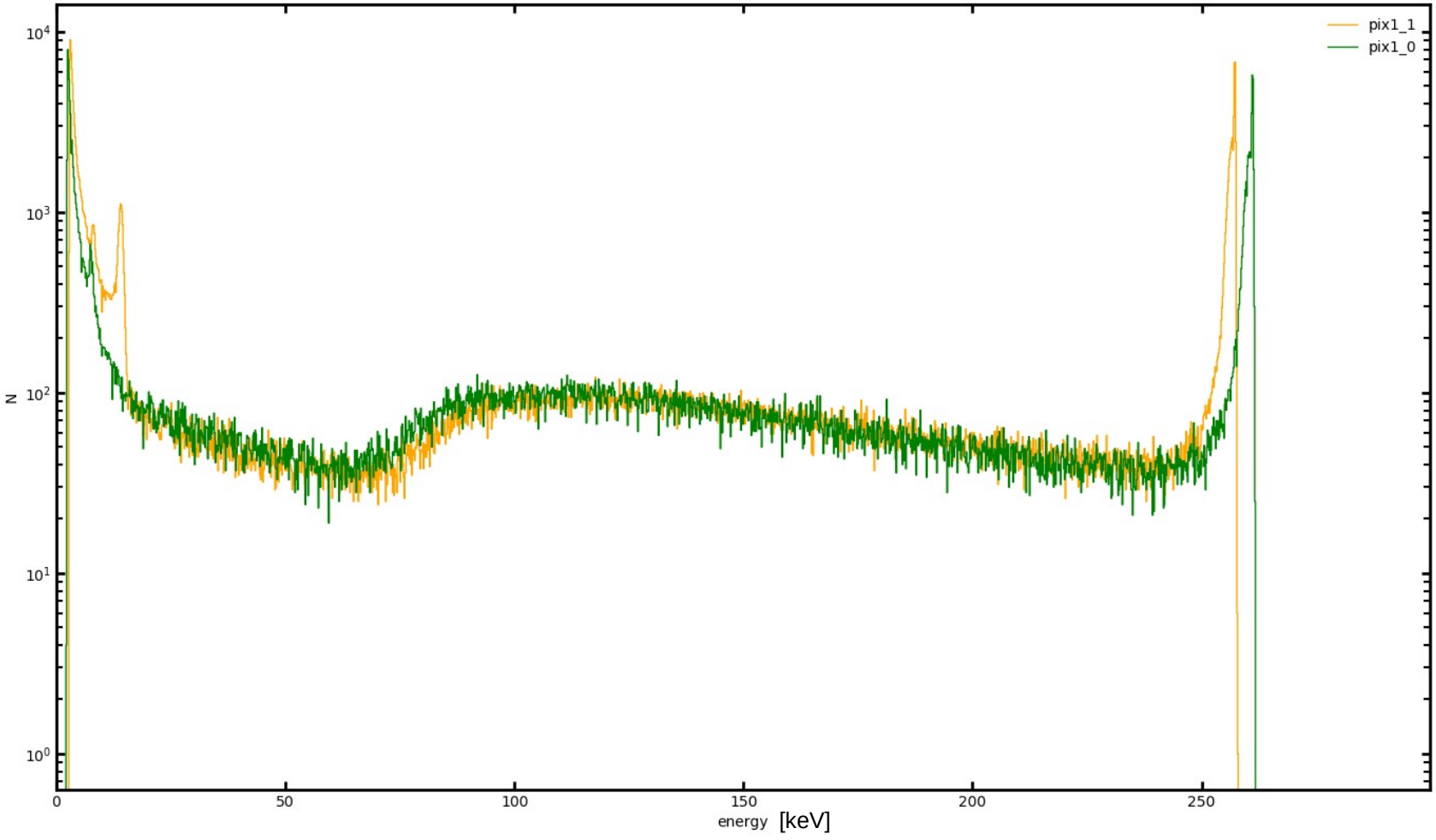
Head 0 Pixel 1 Energy Spectrum Copper Line



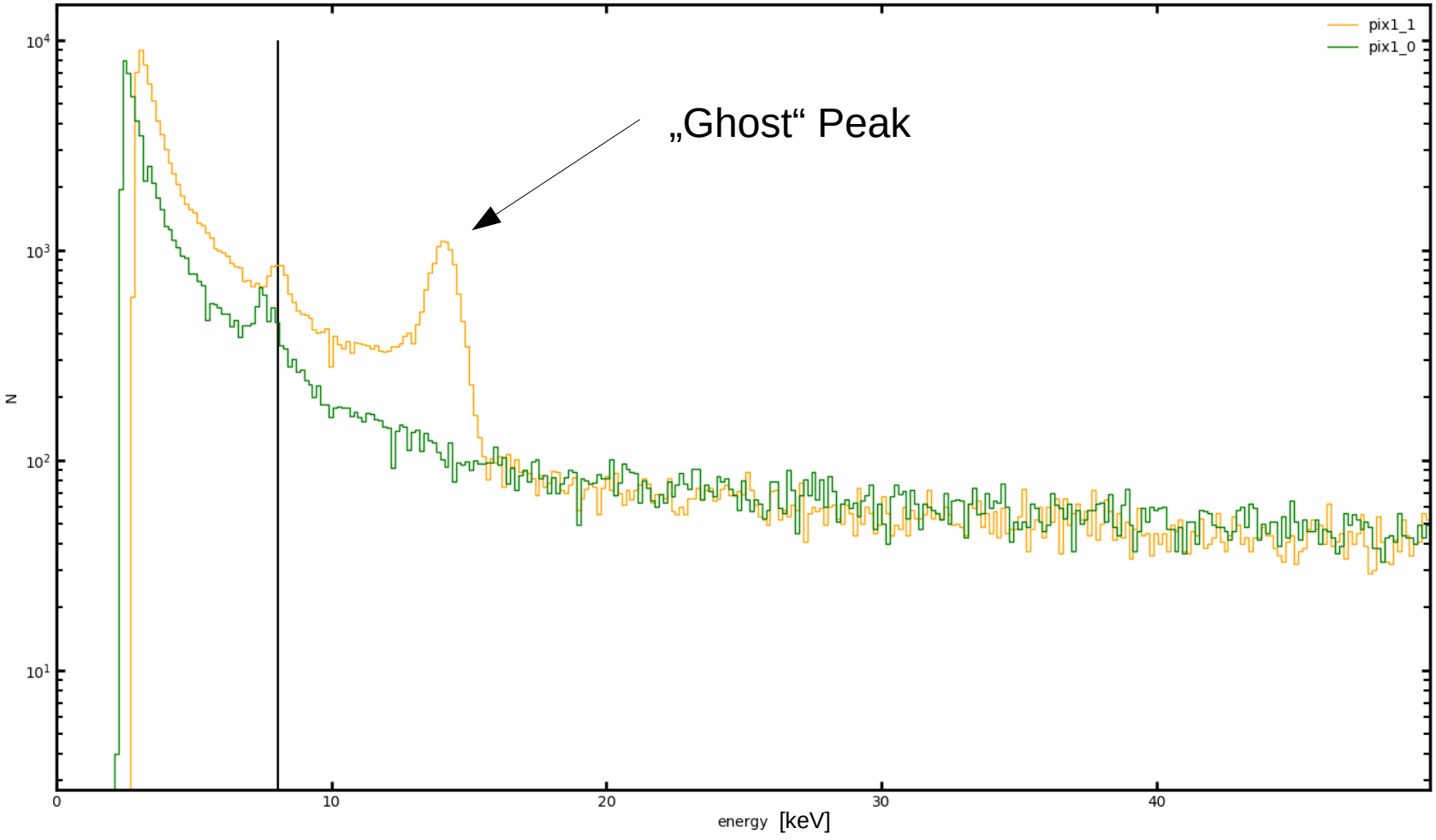
Heads 0,1 Pixel 1 ADC Spectra



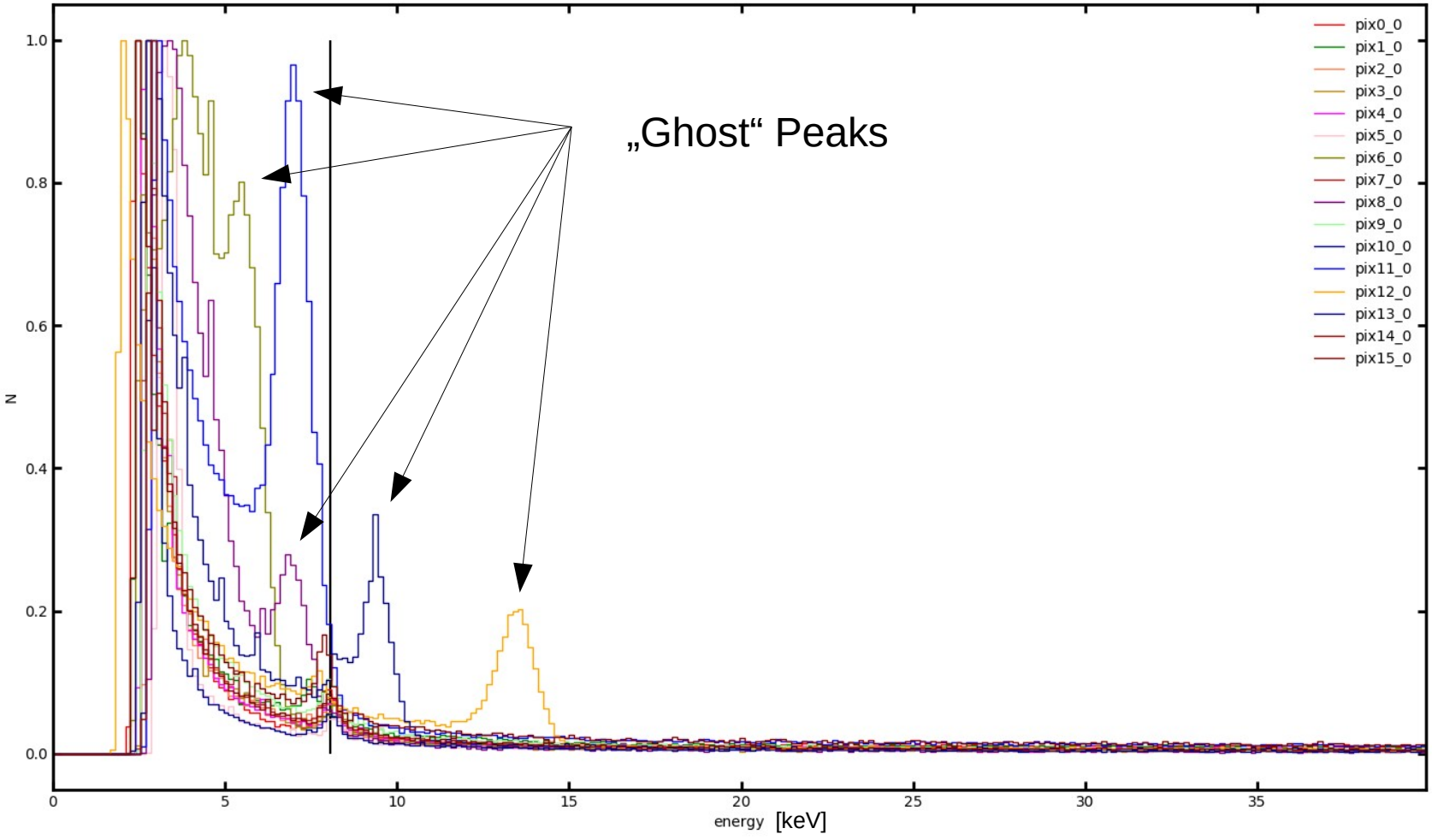
Heads 0,1 Pixel 1 Energy Spectra



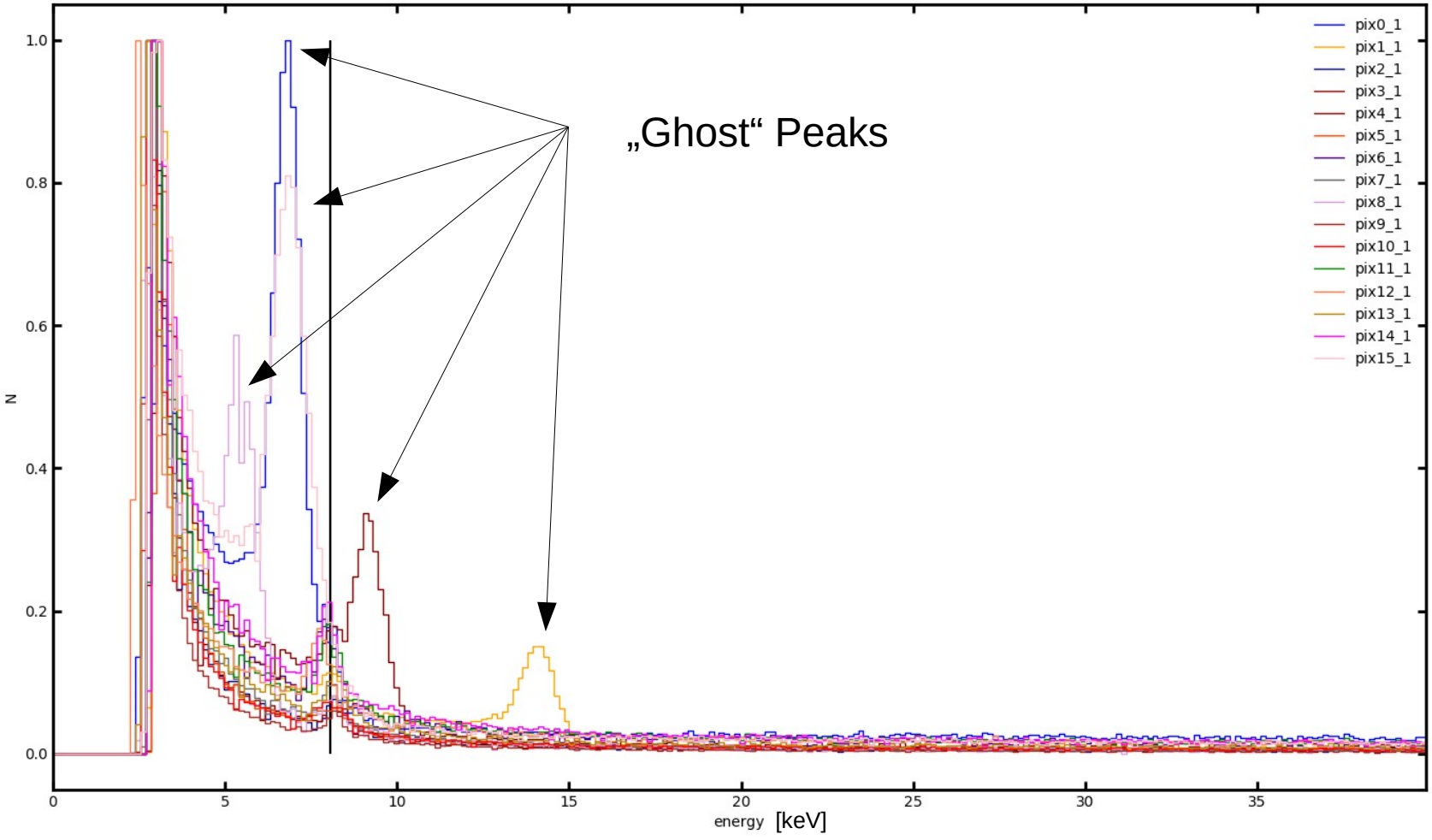
Heads 0,1 Pixel 1 Energy Spectra Copper Line



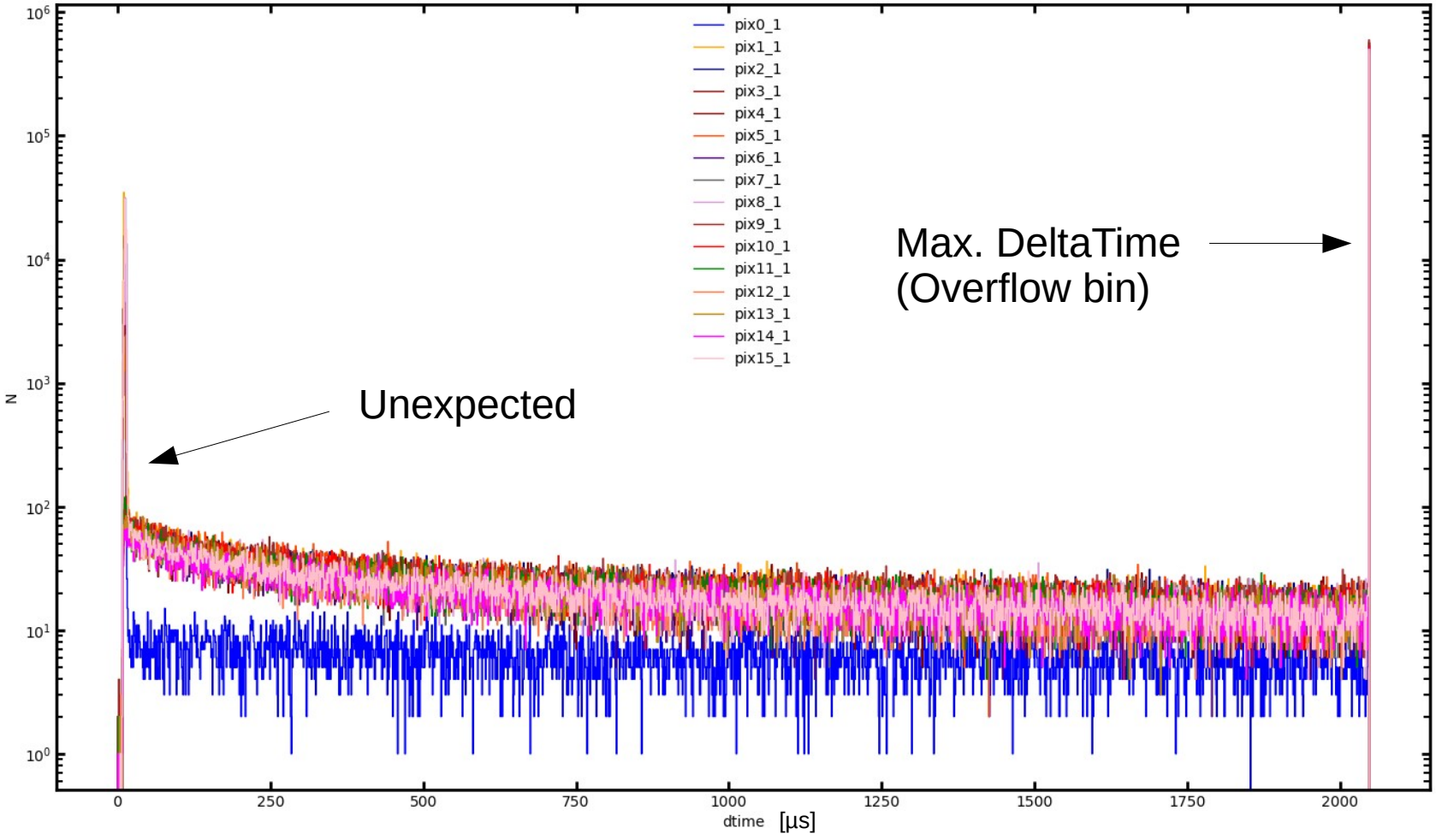
Head 0 Pixel all Energy Spectra Normed Linear



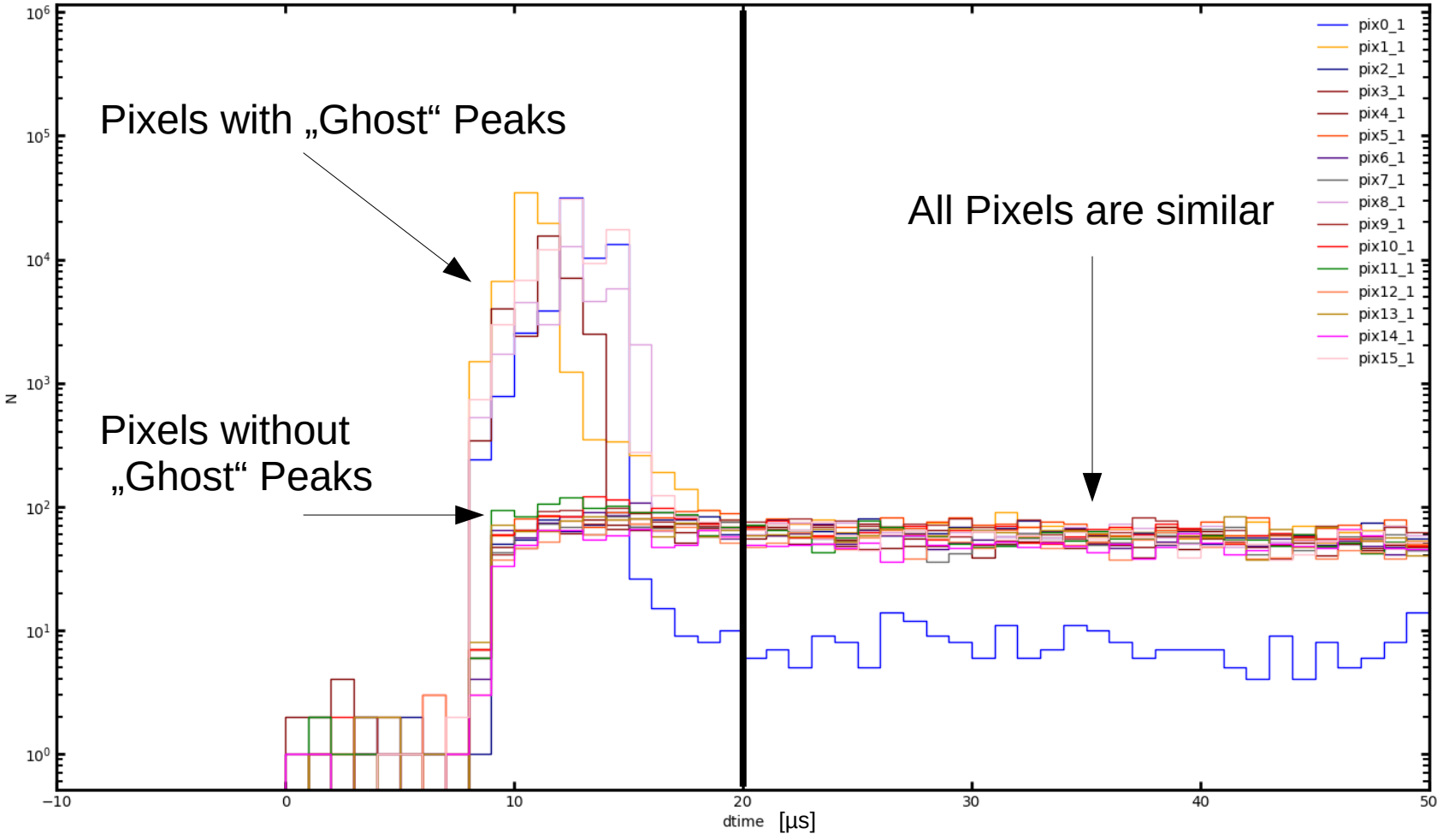
Head 1 Pixel all Energy Spectra Normed Linear



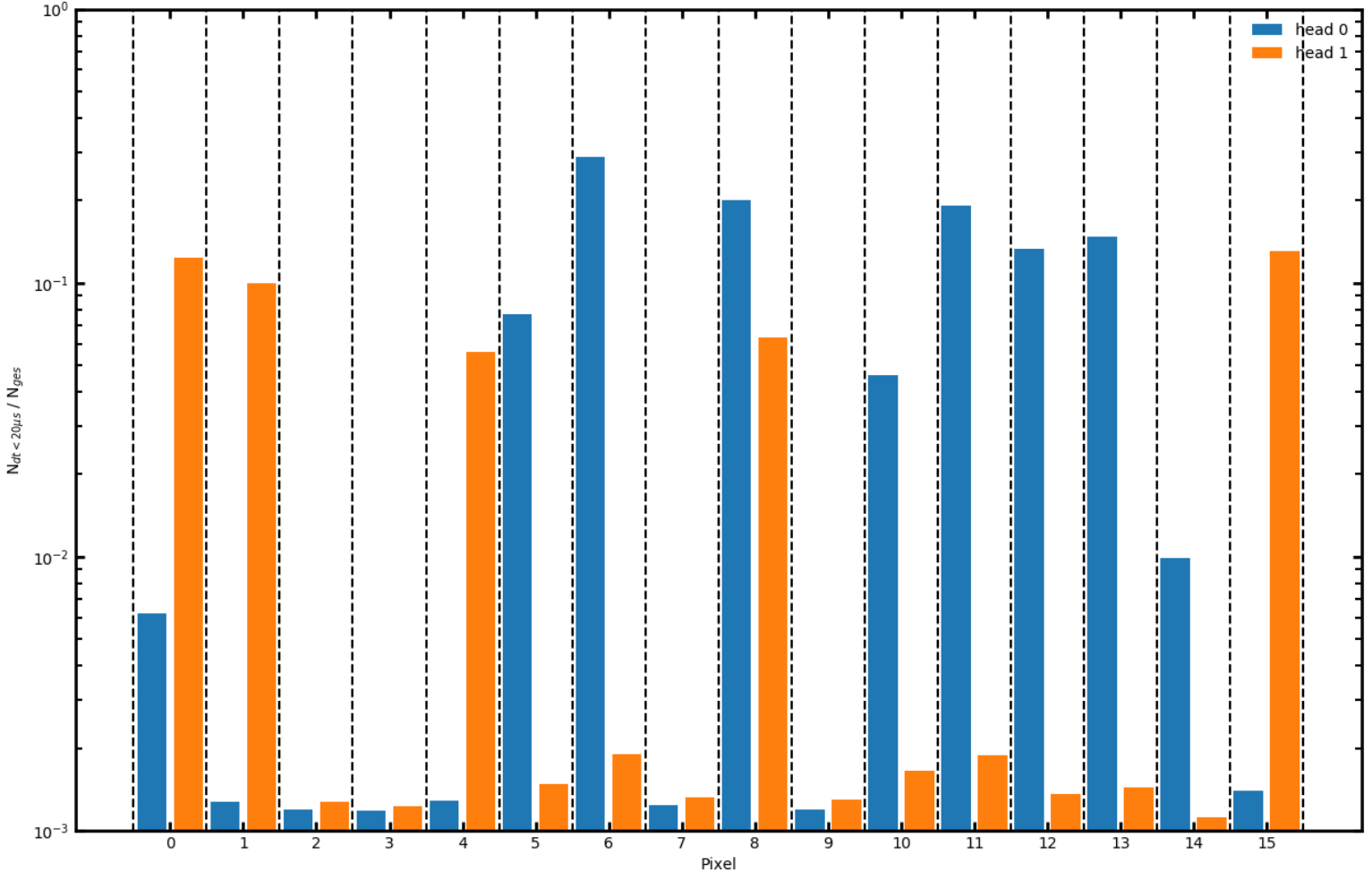
Head 1 Pixel all DeltaTimes



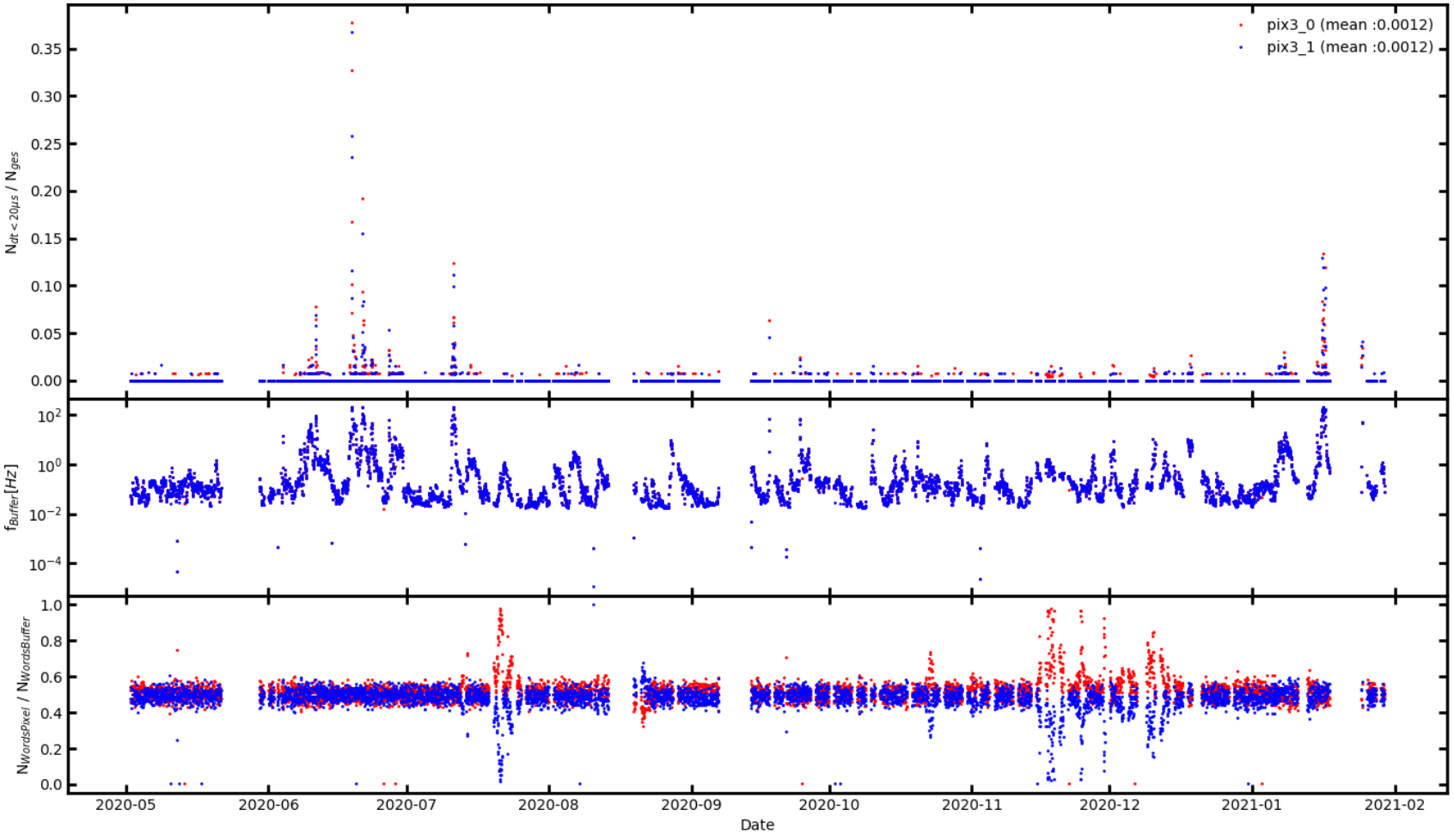
Head 1 Pixel all short DeltaTimes



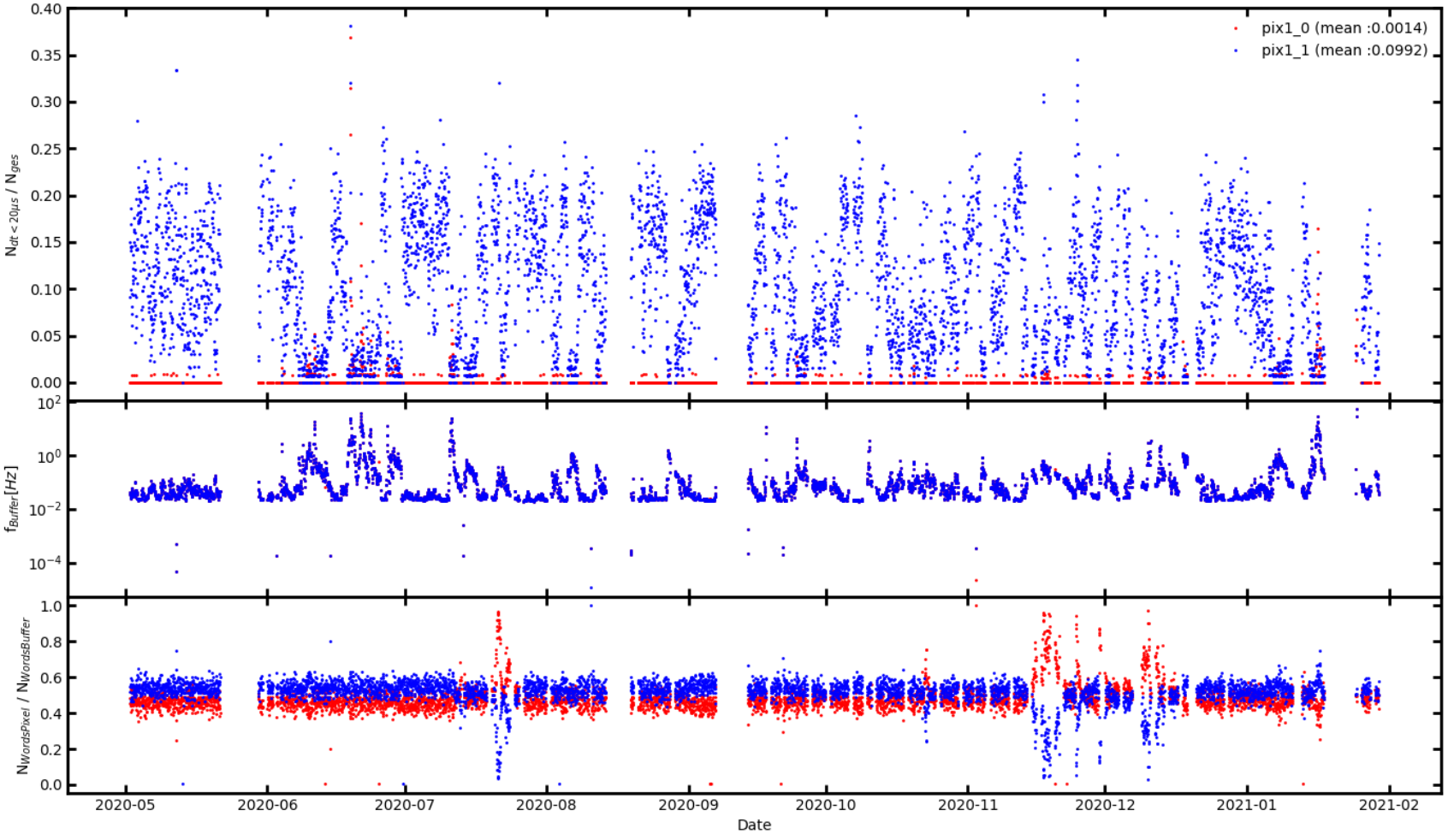
Fractions of dtimes < 20 µs



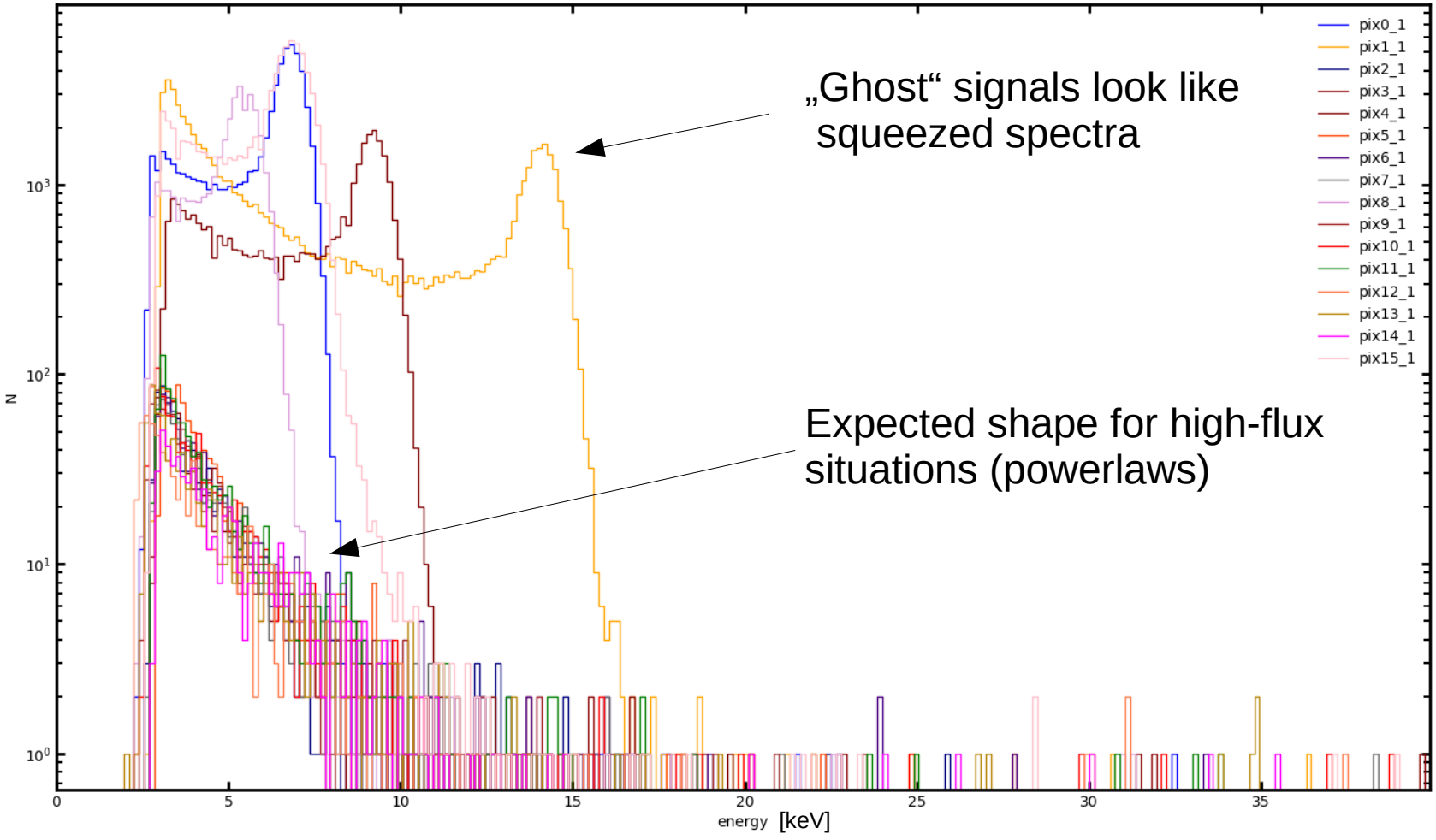
Timeseries „healthy“ pixel



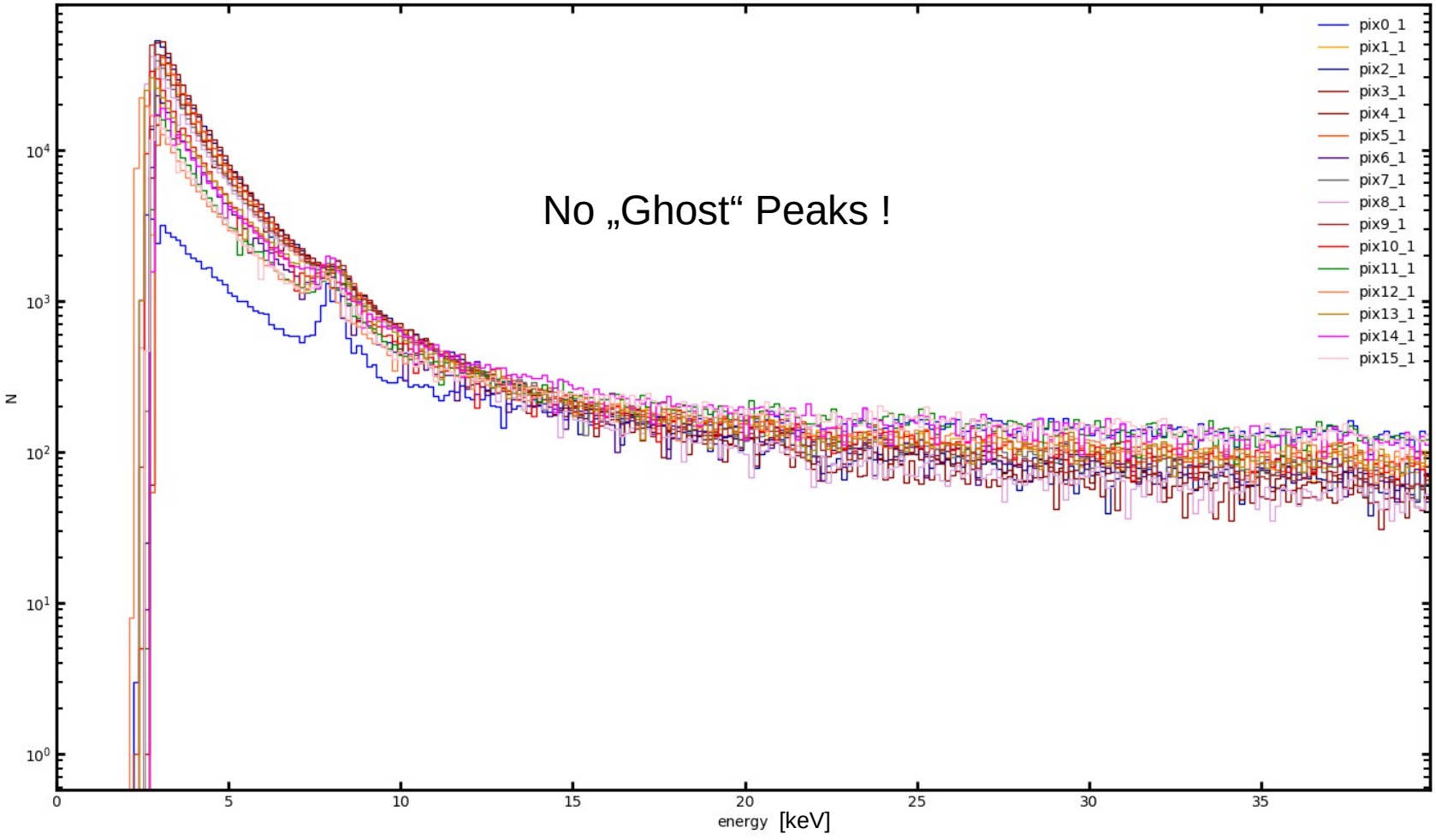
Timeseries „strange“ pixel



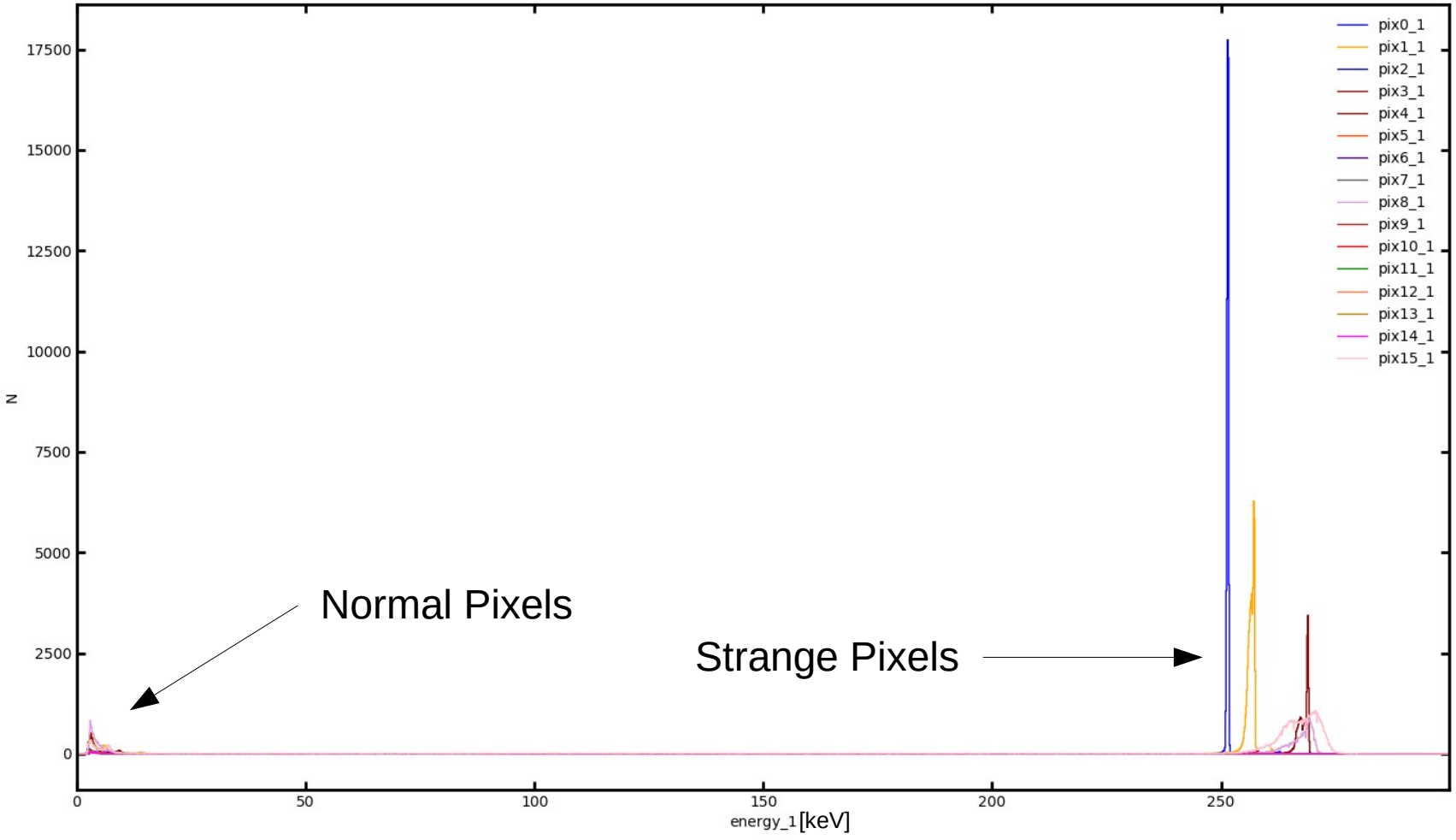
Head 1 Pixel all Energy Spectra DeltaTimes < 20 µs



Head 1 Pixel all Energy Spectra DeltaTimes > 20 µs



Head 1 Pixel all Energy Spectrum Precursor Events DeltaTimes < 20 µs



Head 0 Pixel 1 Energy Spetra for : DeltaTtime < 20 µs, > 20 µs, all