

Controls and DPA at KVI

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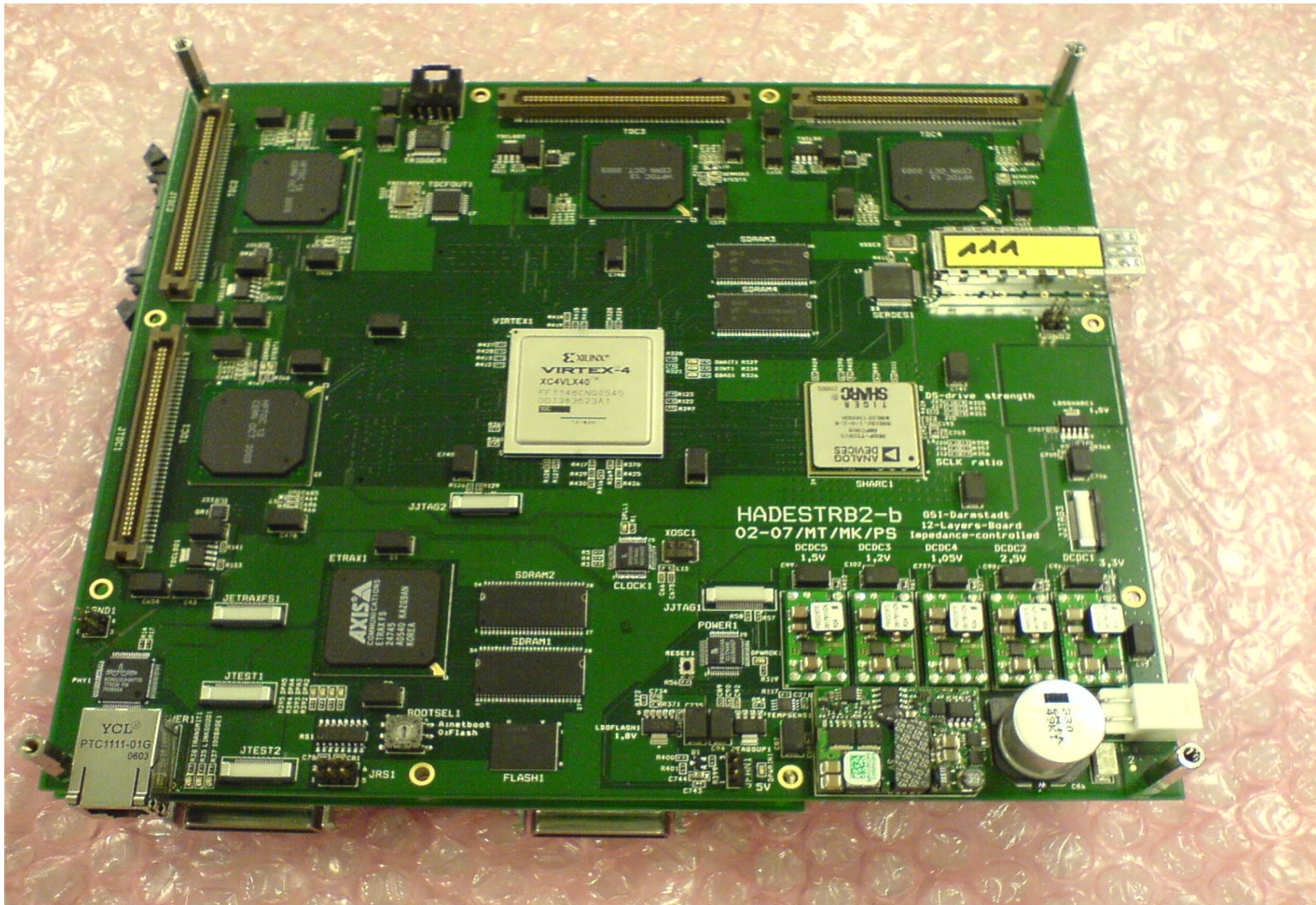


Outline

- Testing hardware platform
- Software frameworks
- PSA
 - Defines dataspace of controls front-end
 - Closes loop for automatic optimization
 - physical parameters
 - PSA functionals
- Illustration on typical cases
- Outlook



Testing platform



Software frameworks

- GRIDCC: test example installed
- MonALISA: under investigation
- EPICS:
 - Strong candidate for FE layer
 - Possible to use with MonALISA as top layer

1st test case: auto-calibration case (PhD)



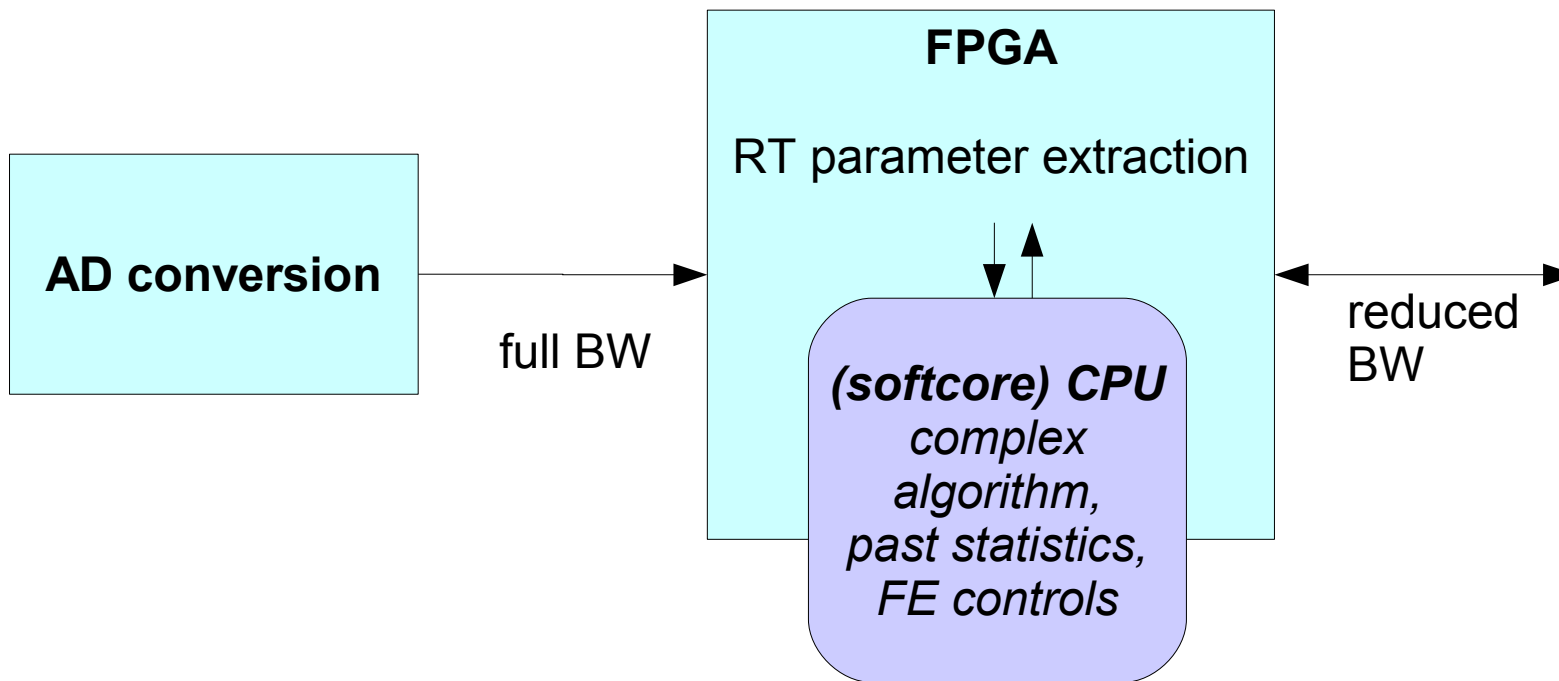
Controls and PSA

- FE dataspace of controls
 - Physical operating parameters
 - PSA functionals that act on raw data
- Both groups to be optimized
 - Need for quality parameters (PSD FOM, ...)
 - Methods to maximize QP (AI, ...)
- Novelty: per-event reporting of uncertainties



HW topology & information flow

- statistically optimal estimators
- HW in mind: fast + slow concept (“FASTER”)

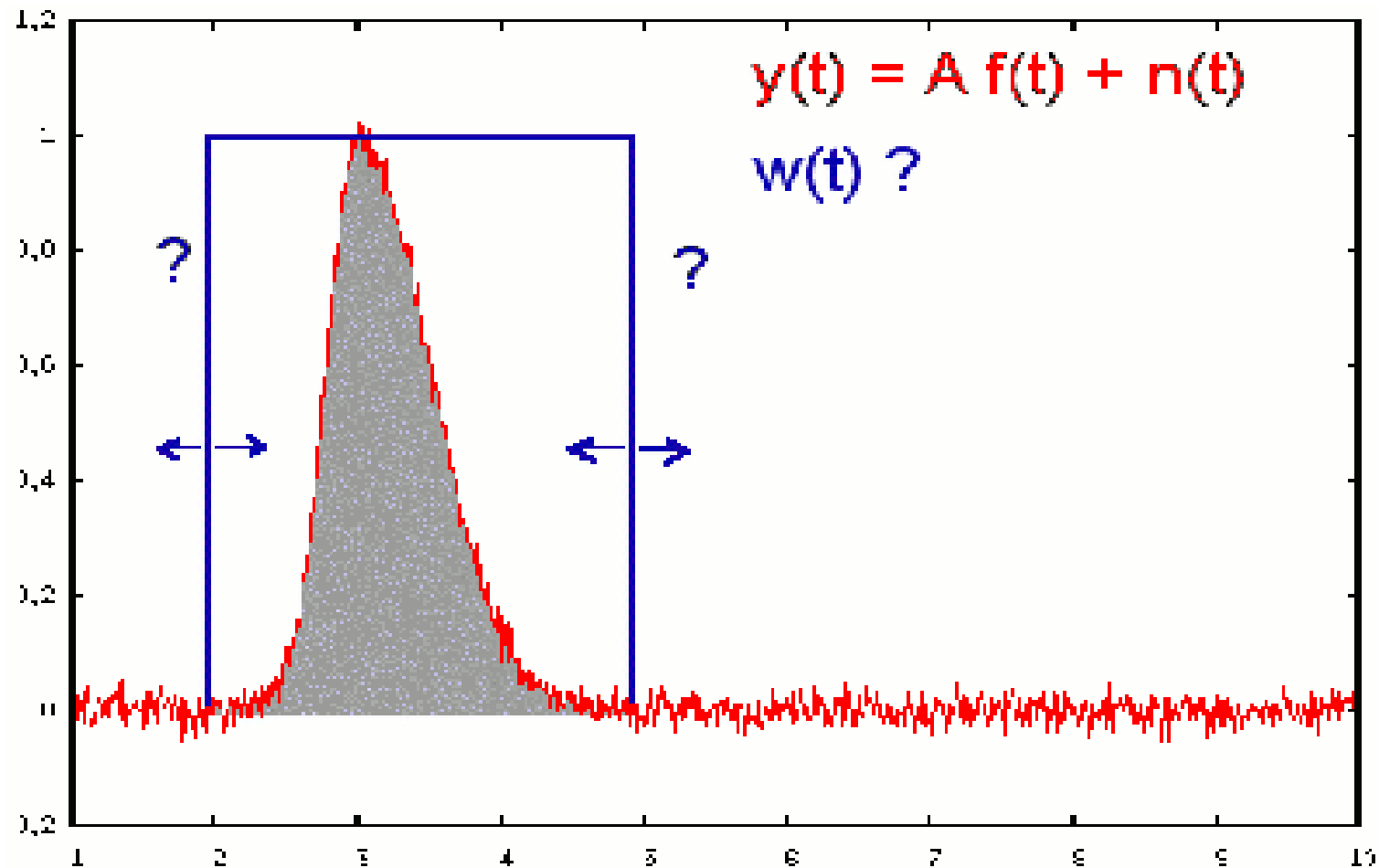


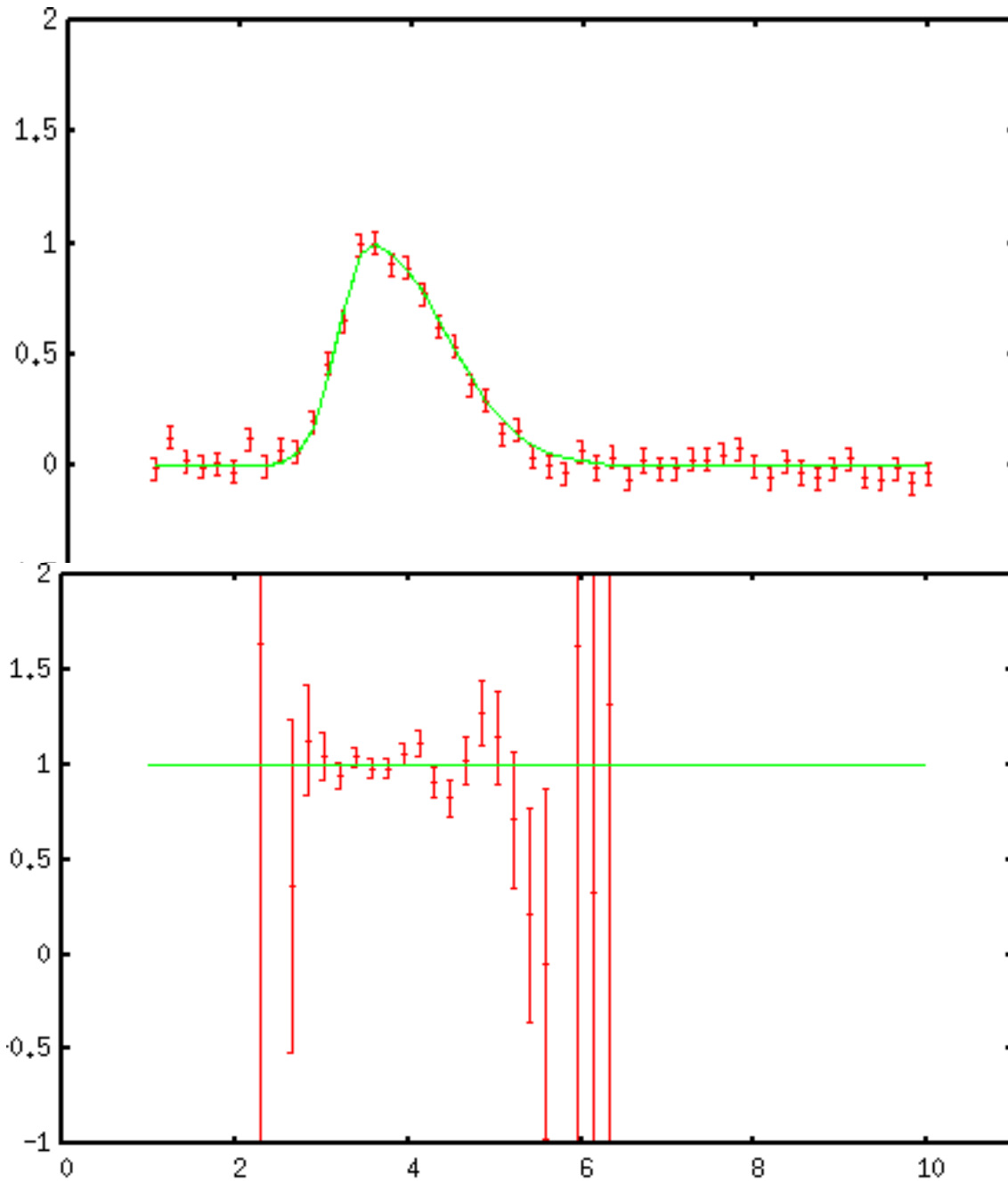
DAQ data by type

1. Amplitude
2. Timestamps
3. Shape descriptors
 - Example parameters for controls



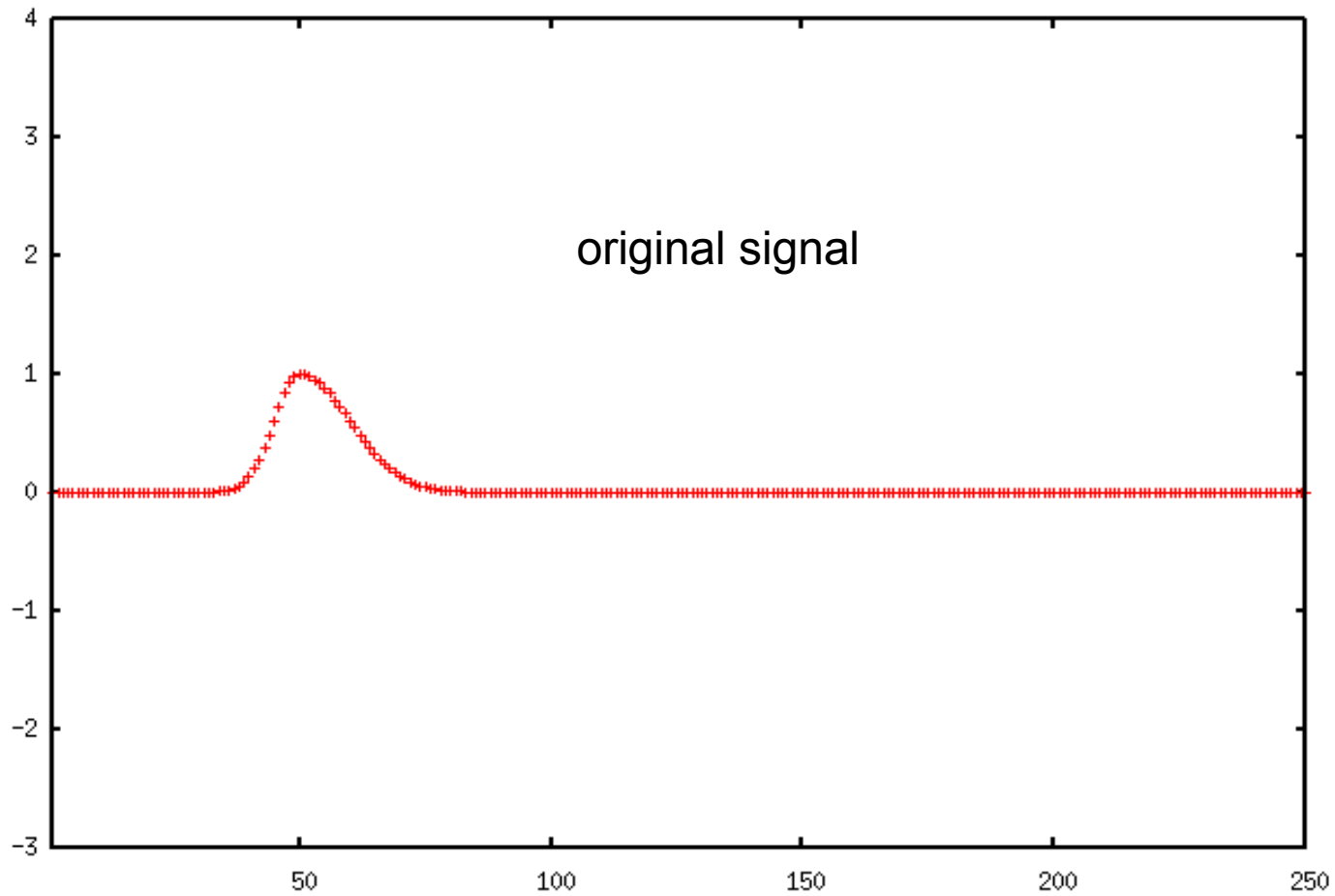
1. Calorimetry

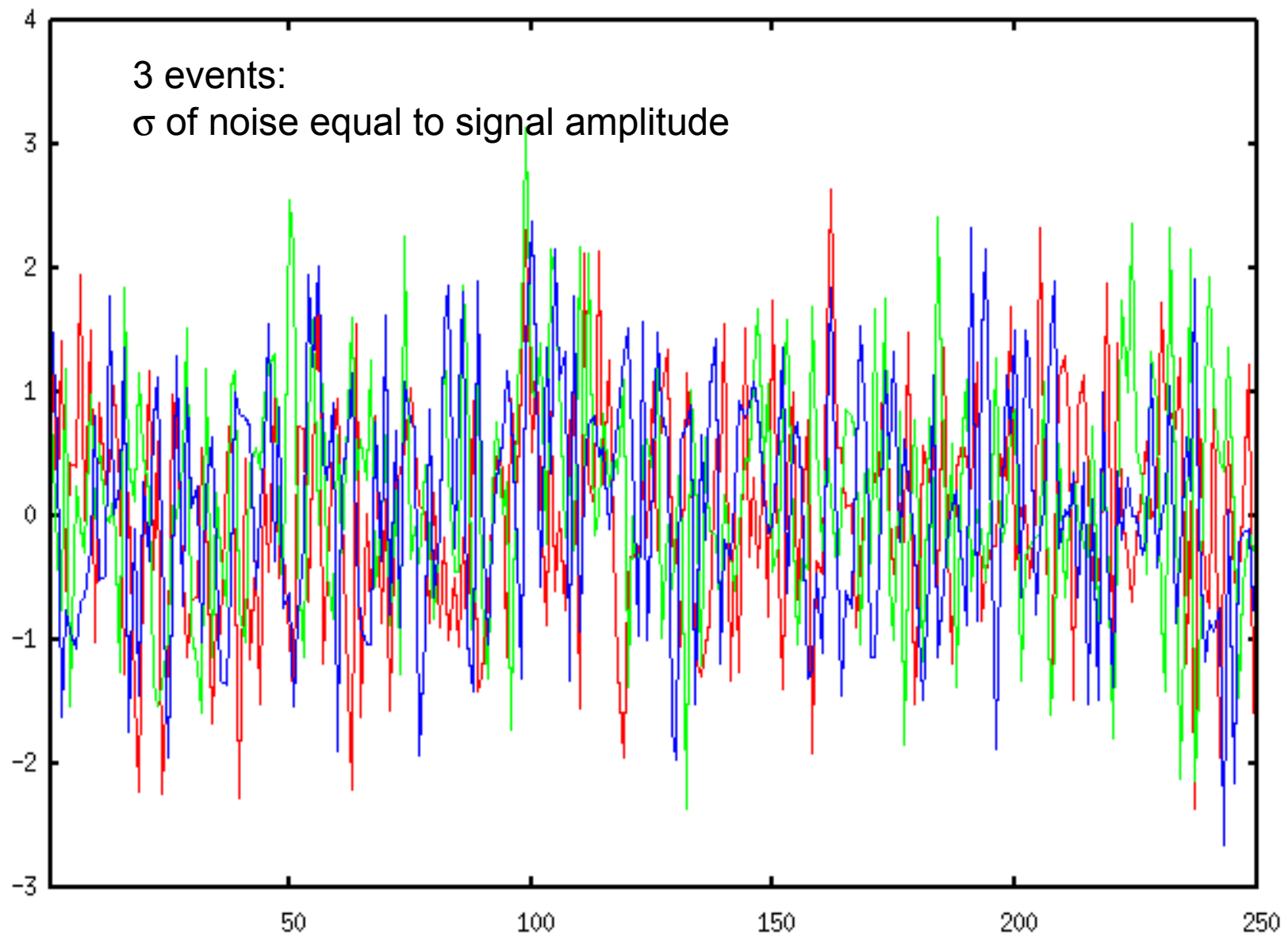




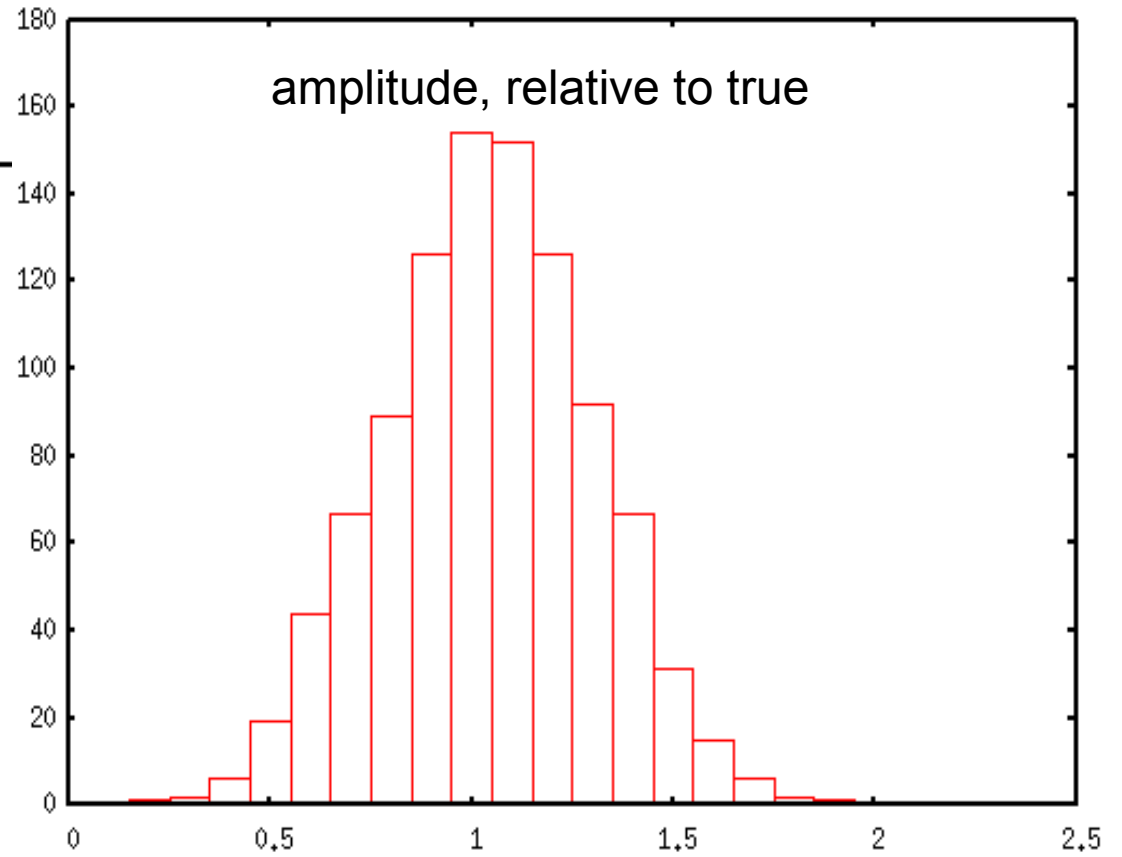
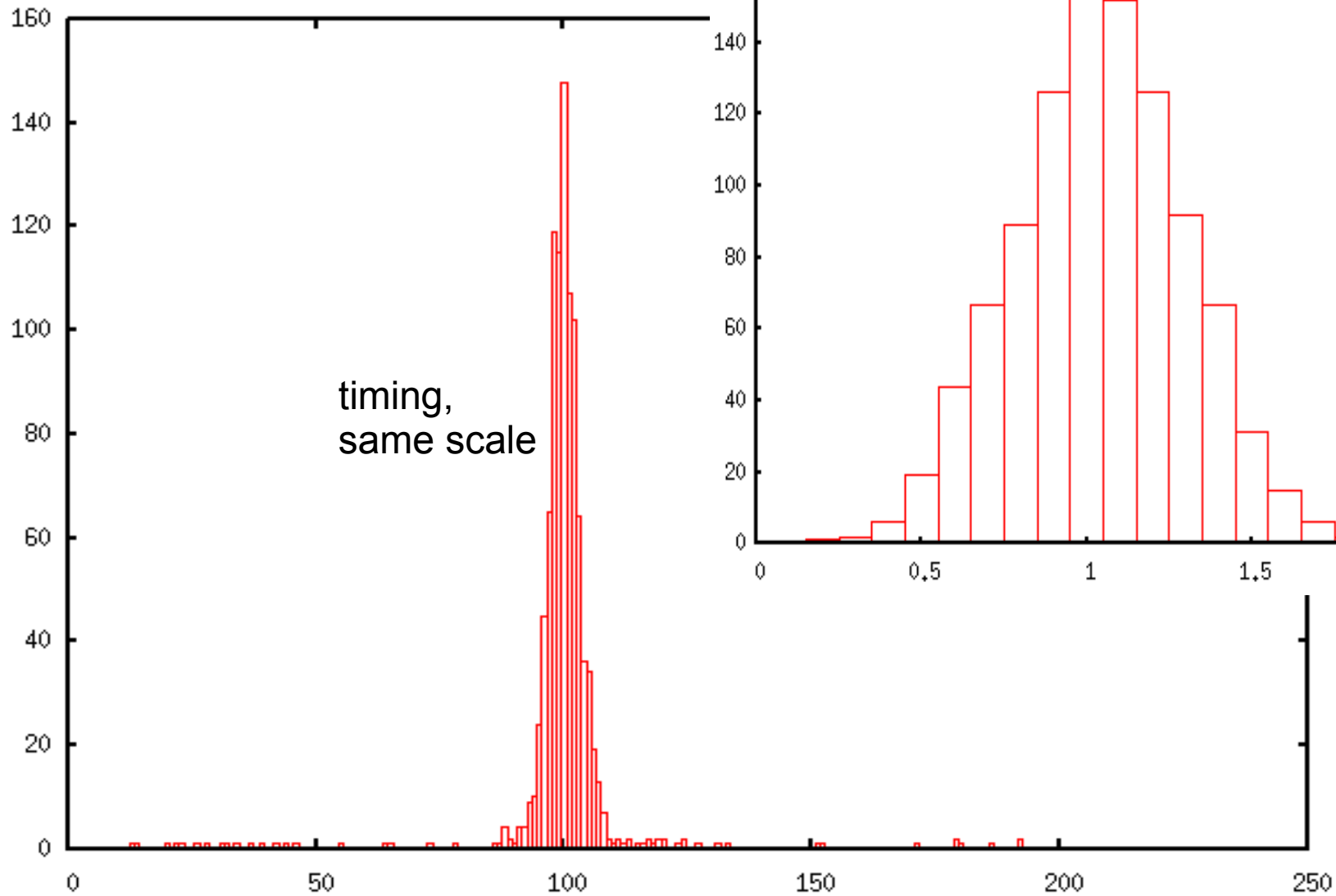
- $y(t) = A f(t) + n(t)$
- $1/\sigma^2$ weights
- weighting function
- pileup treatment underway

- Referring:
- Adonis
- Bardelli





1000 events:

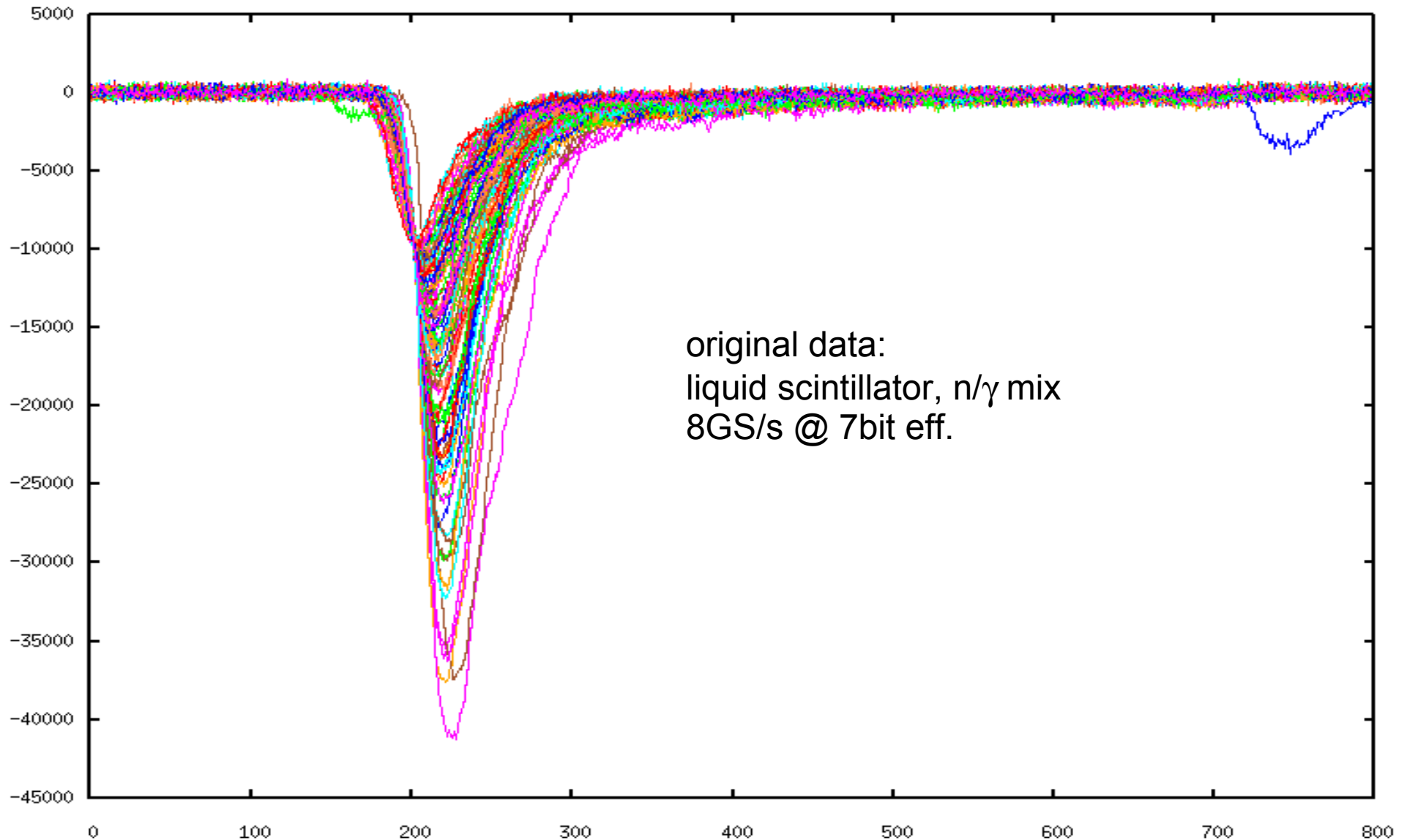


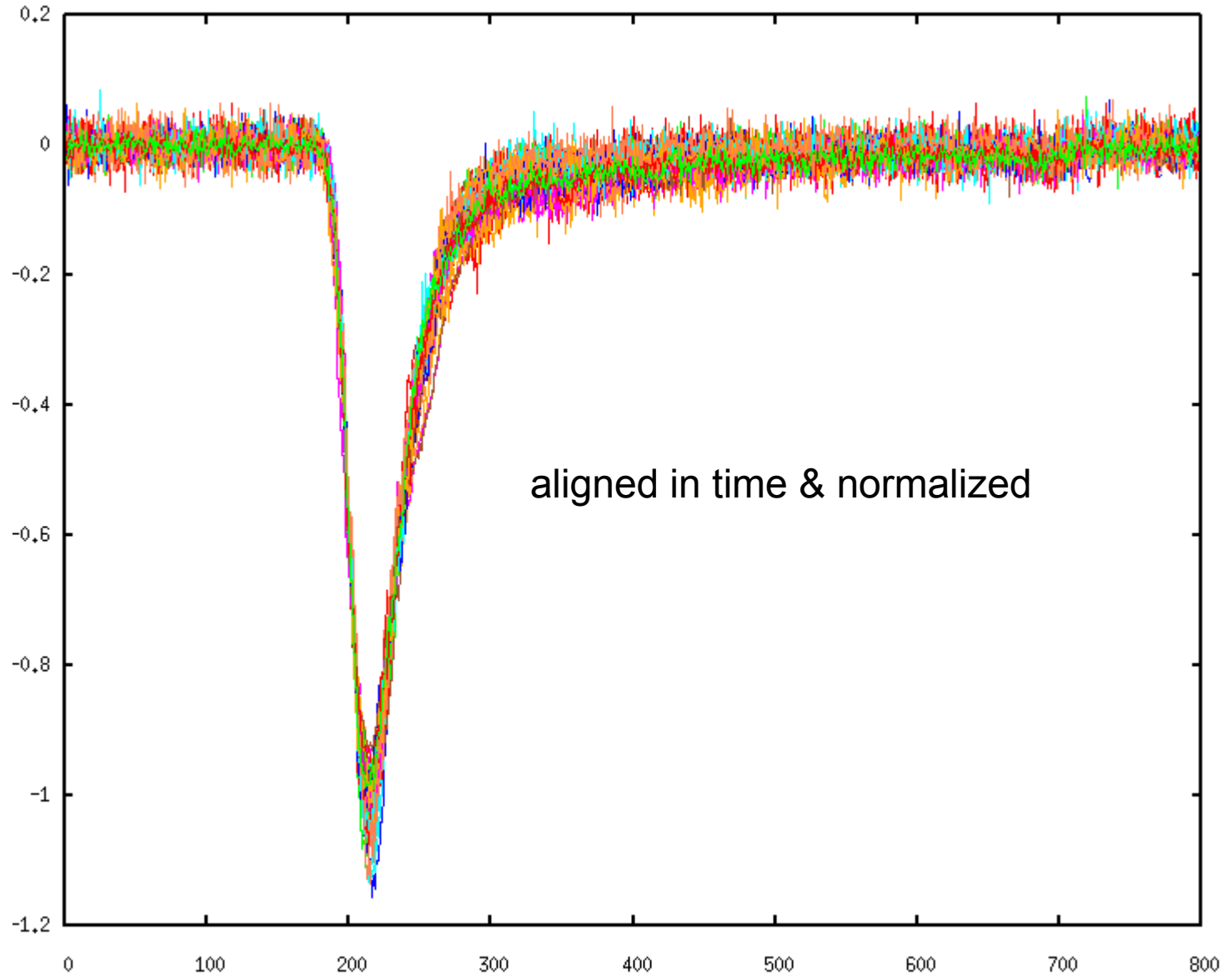
2. Timestamping

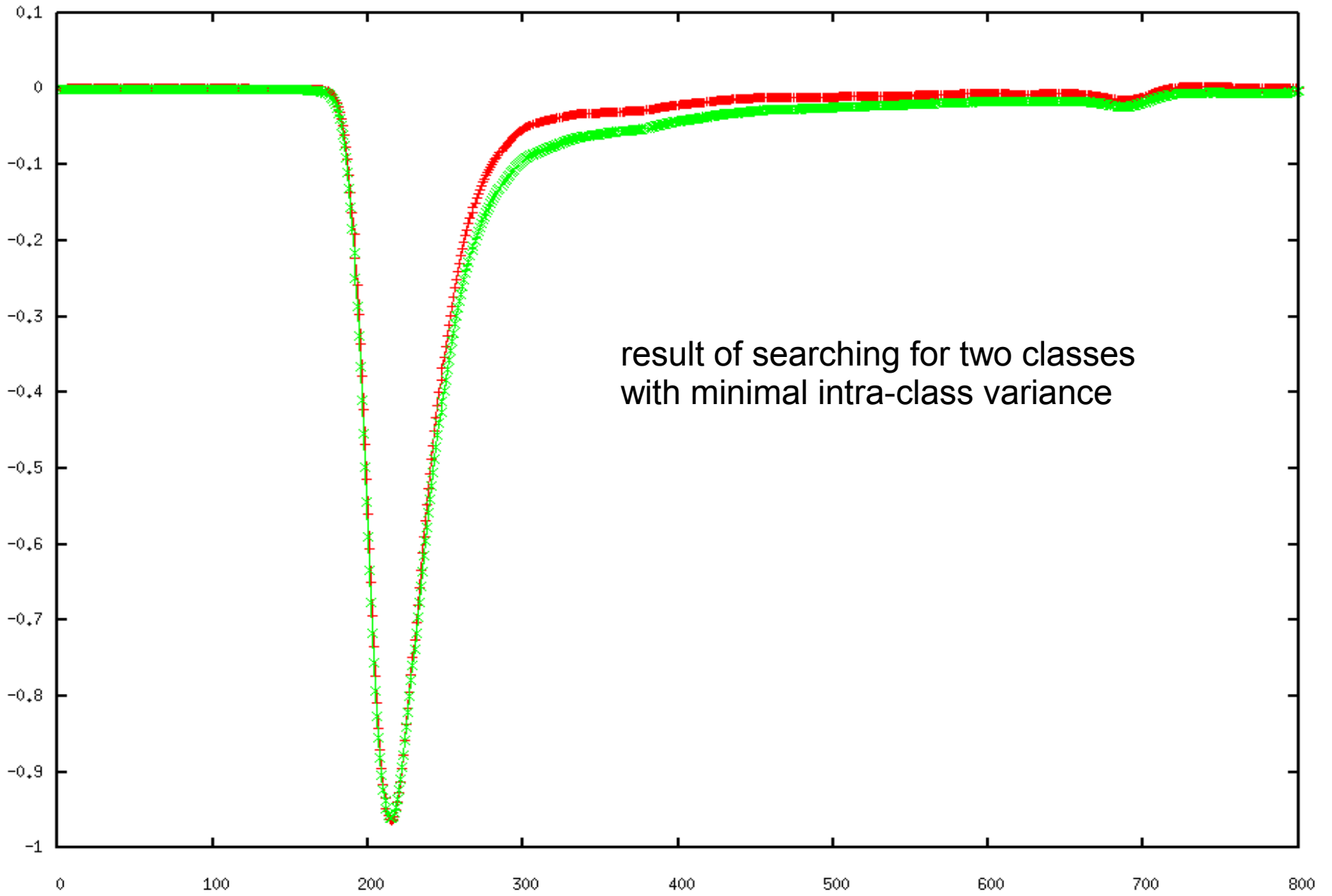
- Precision timestamping for PET
 - student project
 - Pim Lubberdink, University of Groningen / Hi-Light
- FPGA implementation (Zero dead-time at 1GS/s on Altera Cyclone II)
 - ing. Peter Schakel, KVI
 - student project
 - Rene Kist, University of Groningen



3. PSD

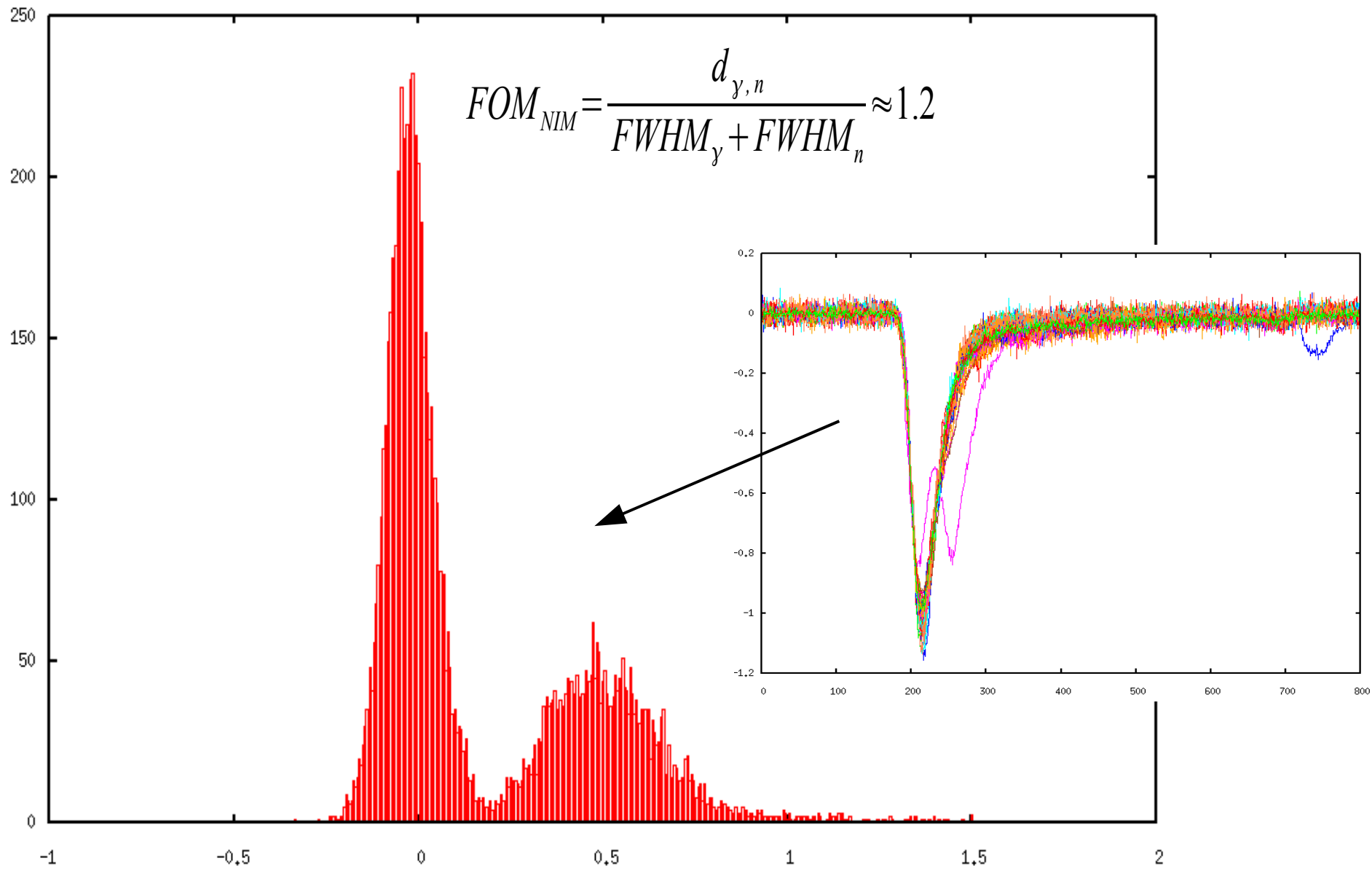






result of searching for two classes
with minimal intra-class variance





Outlook

- Starting projects
 - robust auto-calibration techniques (E, t, PSD)
 - specific energy dissipation (ADC, FPGA, ...)
- Manpower
 - adding to KVI's controls and PSA
- community input
 - coding conventions for SW to be delivered

