

SGFD Meeting

LNL, Legnaro, Janurary 22-23, 2007

Matjaž Vencelj:
Digital Pulse Analysis @ KVI

Outline

- **preaching**
 - role of waveform digitization
 - conceptual obstacles
 - preprocessing within DAQ
- **case studies**
 - timing
 - triggering at $S/N \ll 1$
 - PSD for n/γ

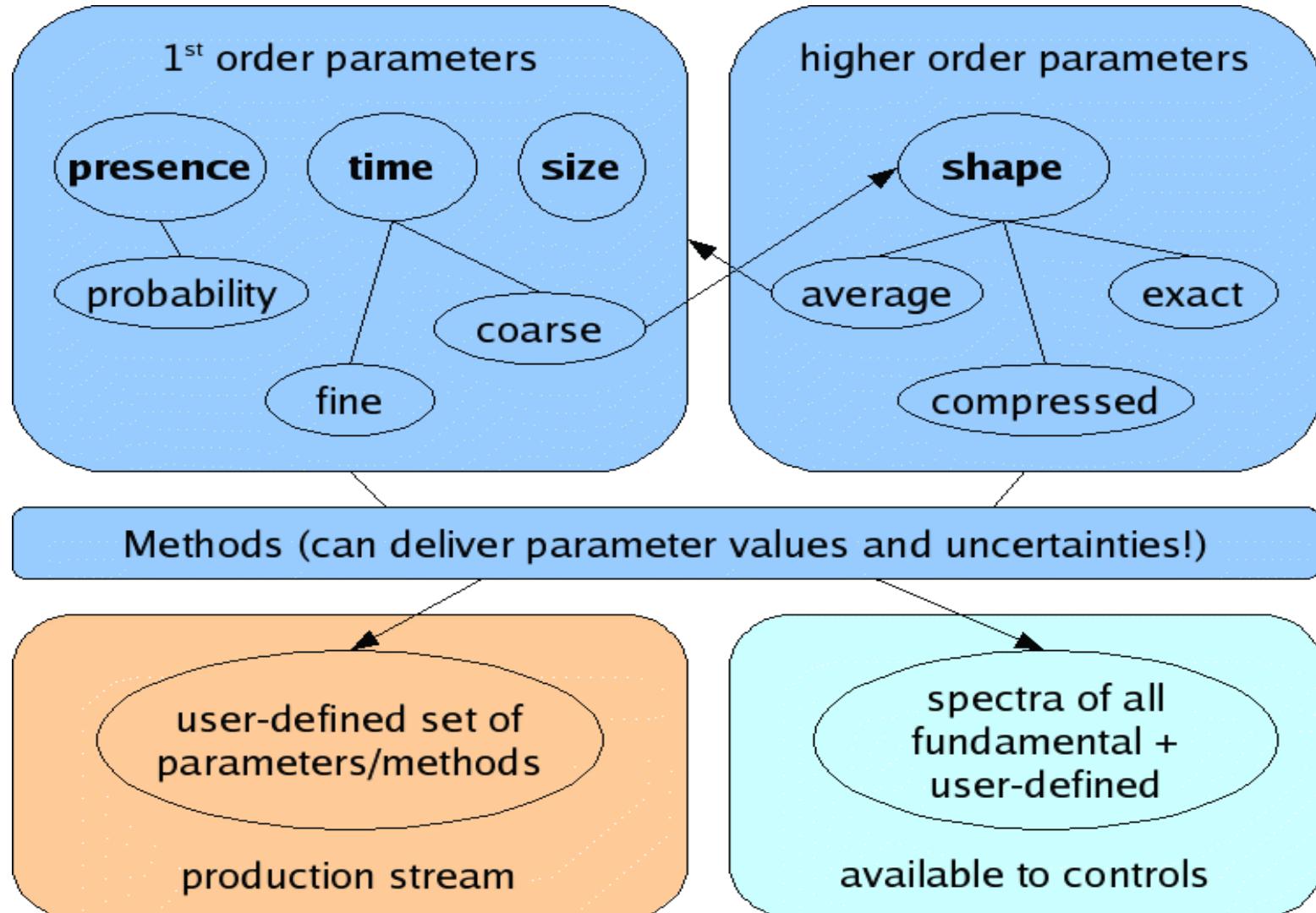
Digitized waveforms

- not a universal cure-all
- allows (as everyone knows):
 - numerical BW reduction / compression
 - often superior results (more choice)
- **but also!**
 - control of system status
 - automation of tuning

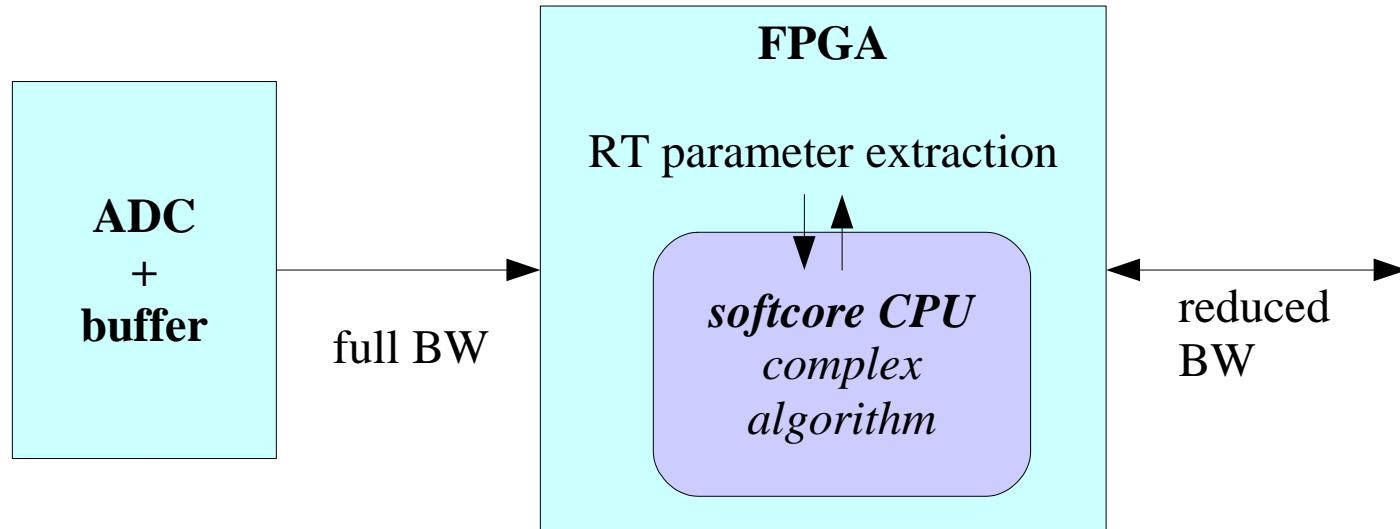
Conceptual shift

- analog methods implemented digitally
 - CFD timing (warning case)
 - peak follower spectroscopy (same)
 - often inferior results
- from scratch approach
 - use all available information within pulse
 - optimal parameter extraction
 - forces asking proper questions
 - implement

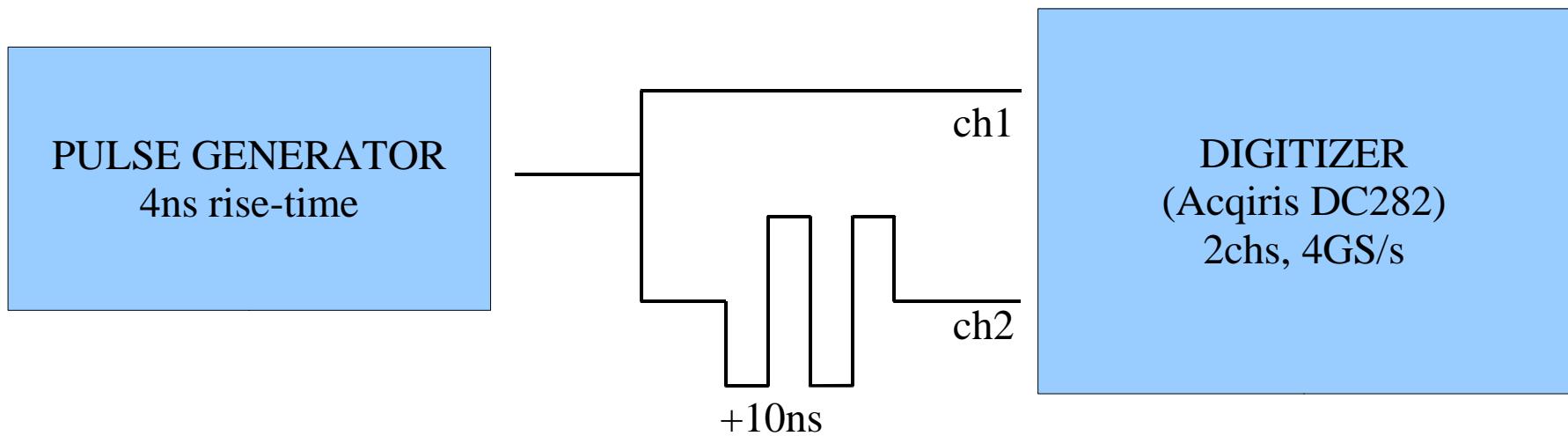
Data-flow and processing

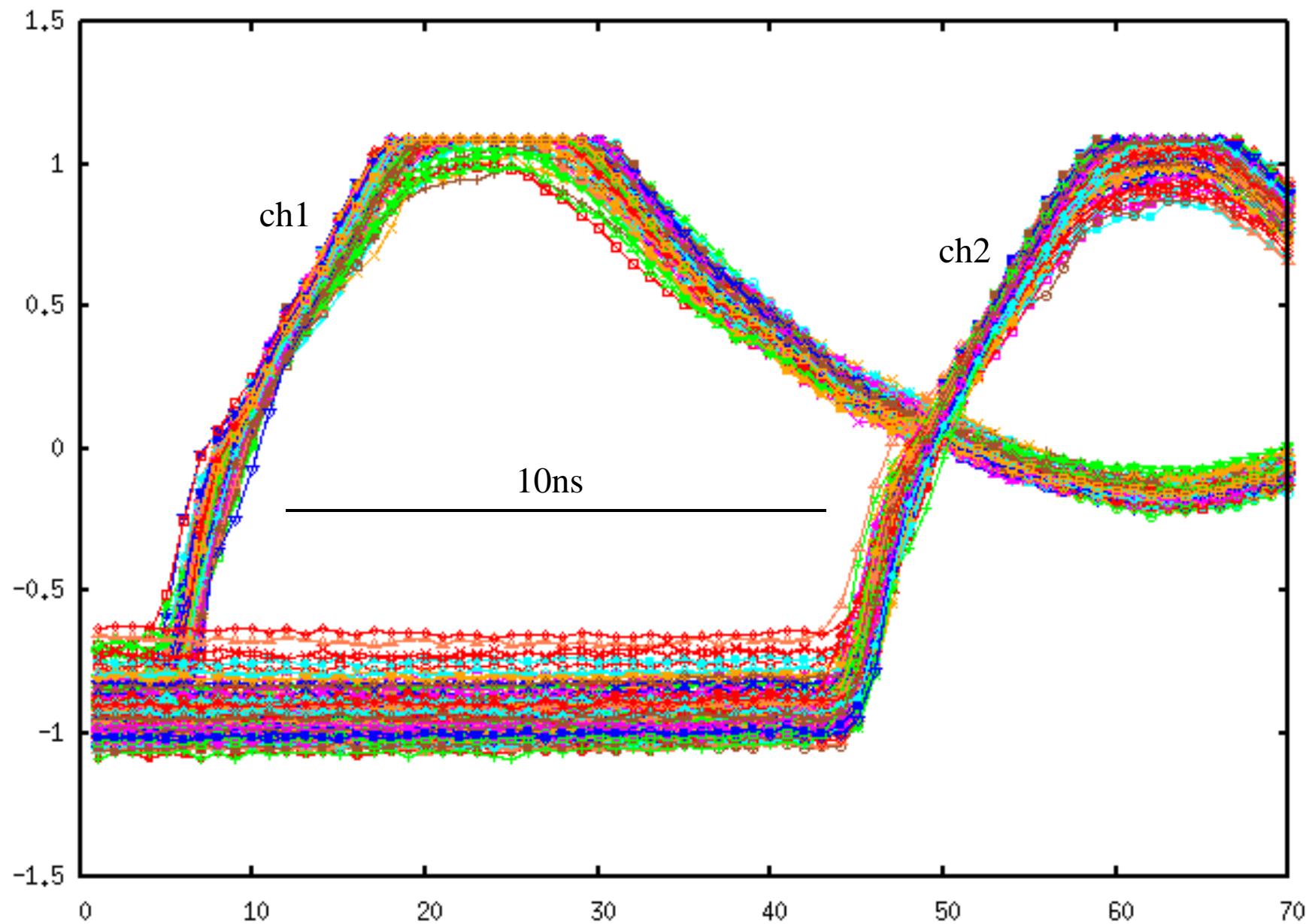


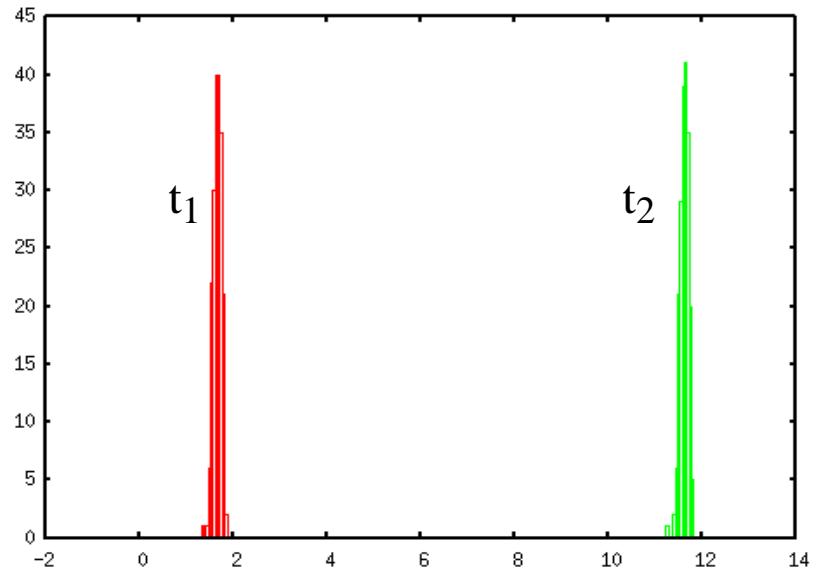
Concept *FASTER* (*LPC Caen*) + KVI DPA methods:



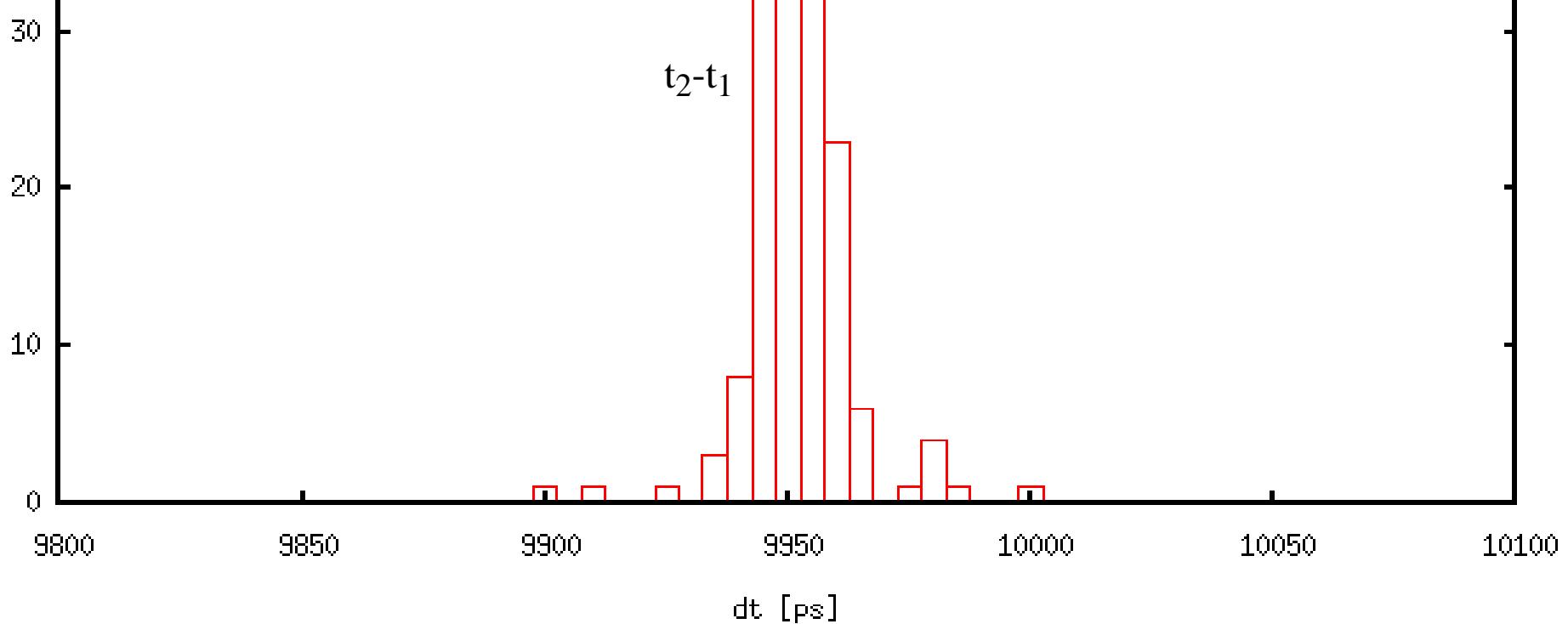
Example 1, timing



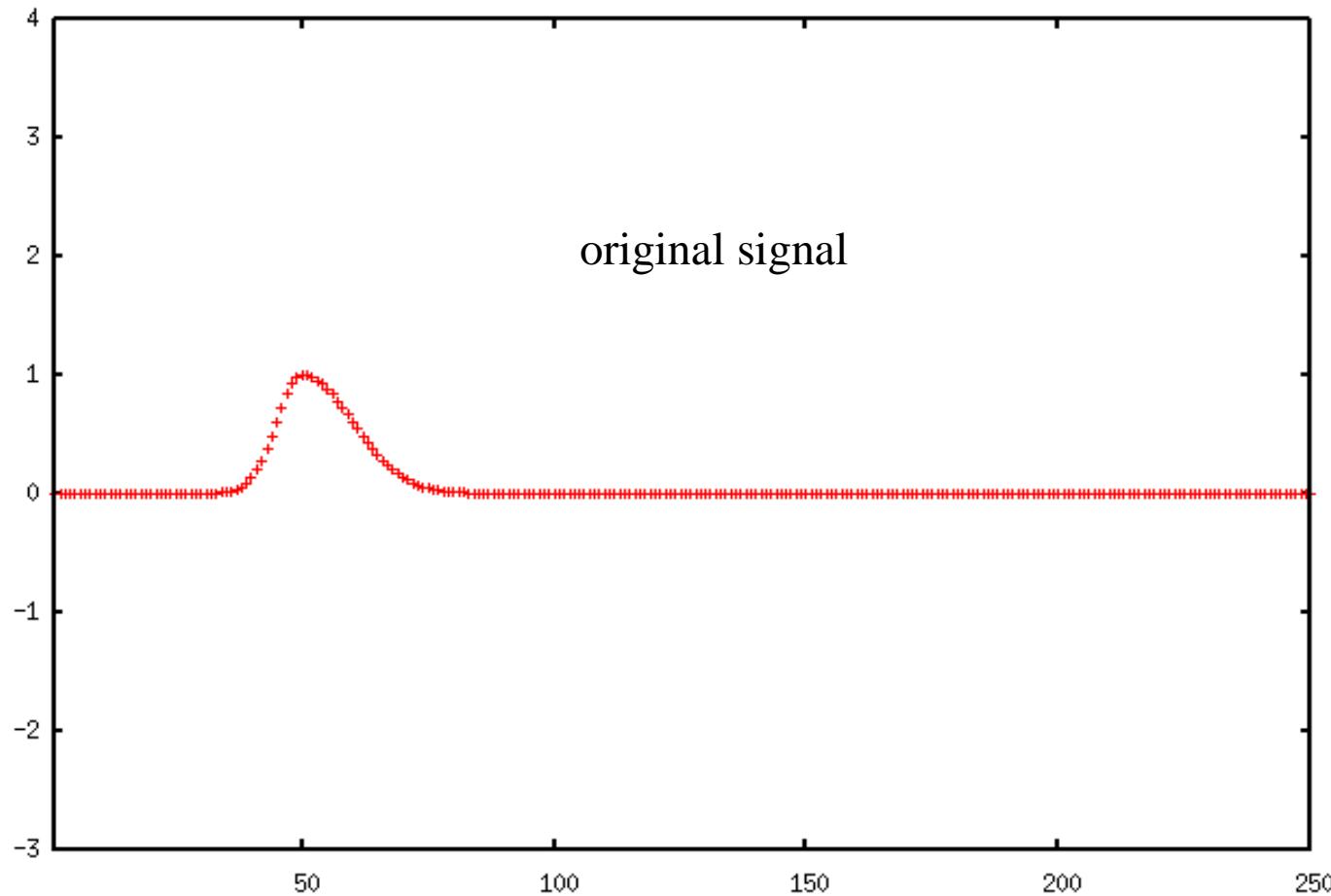


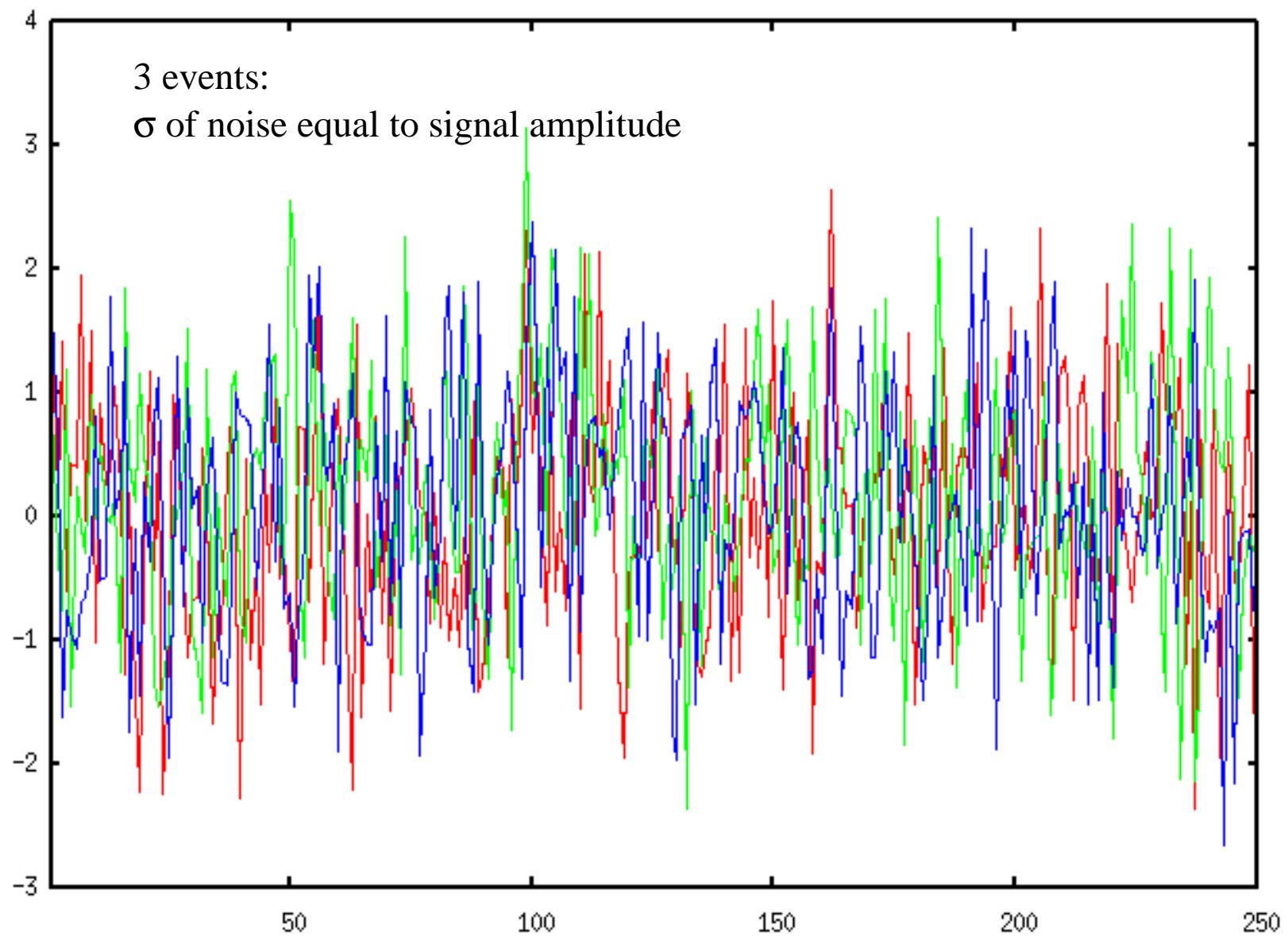


$\sigma = 9.7 \text{ ps}$
reduced: 6.9 ps
(= 0.03 sampling periods)

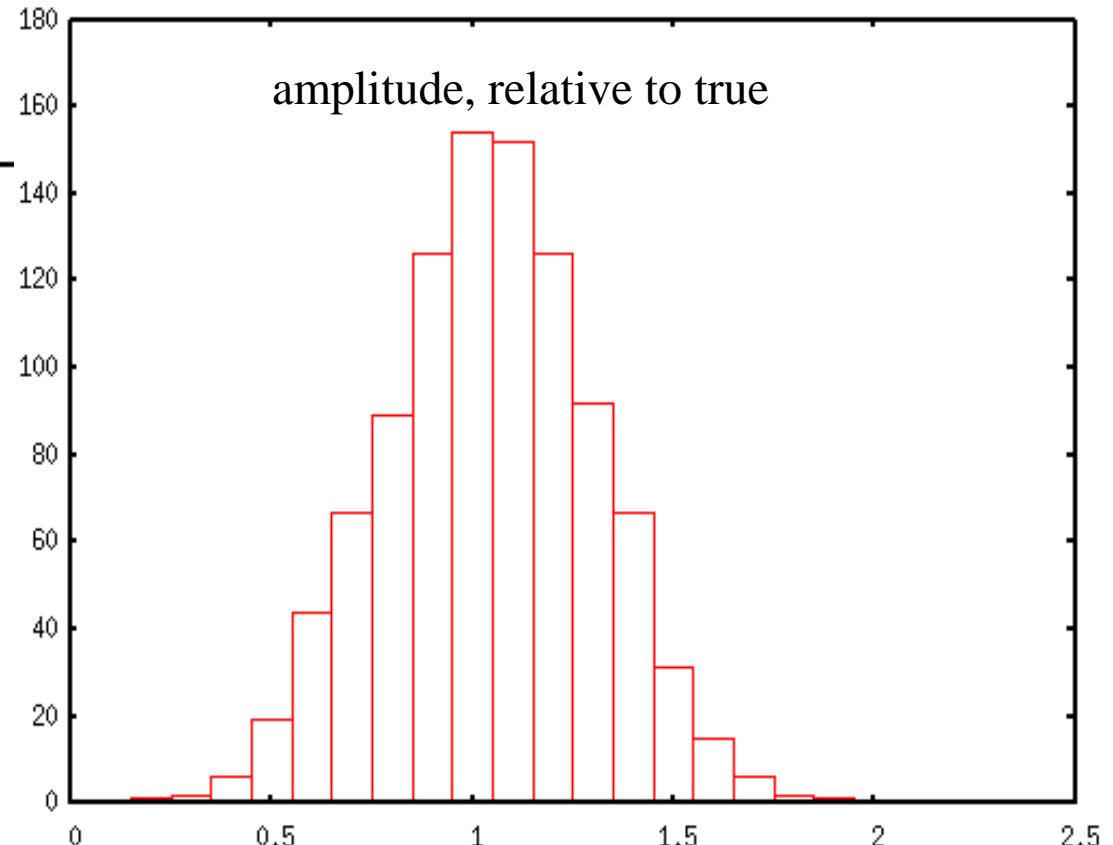
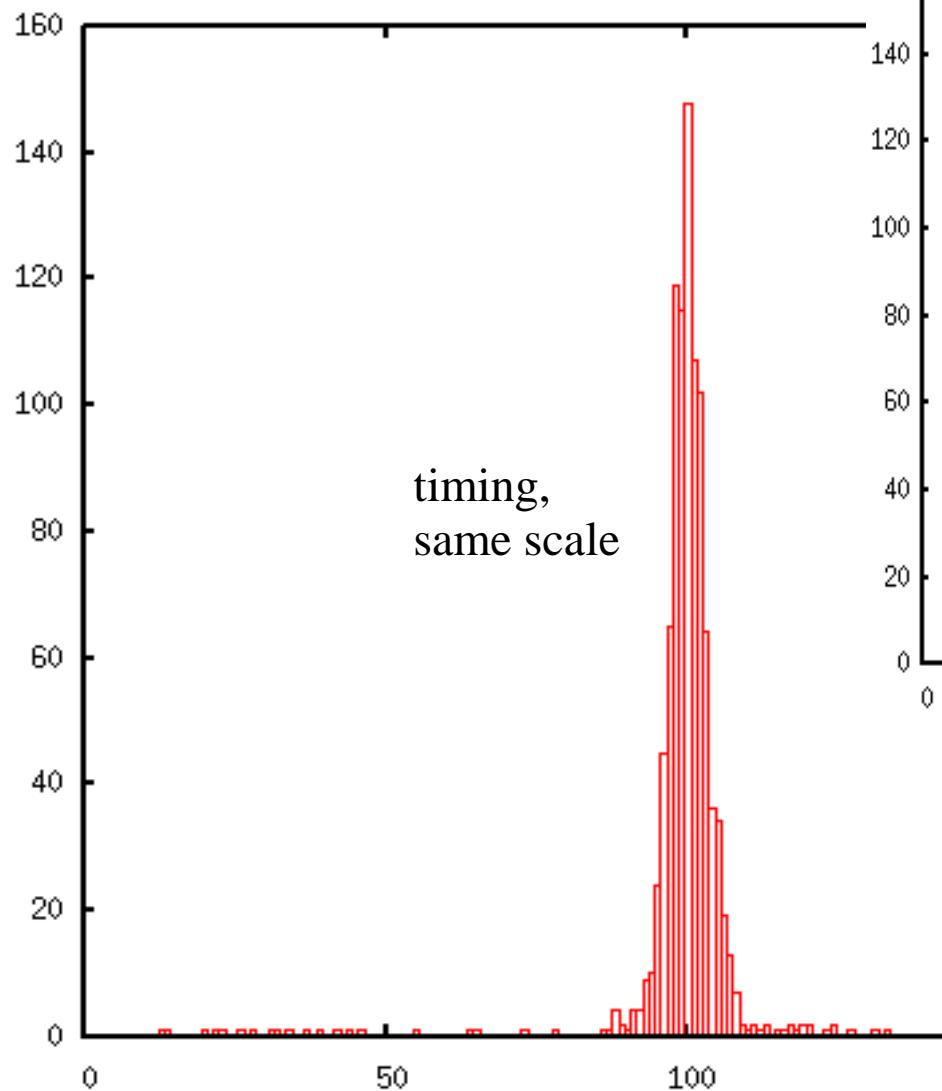


Example 2, noisy triggering

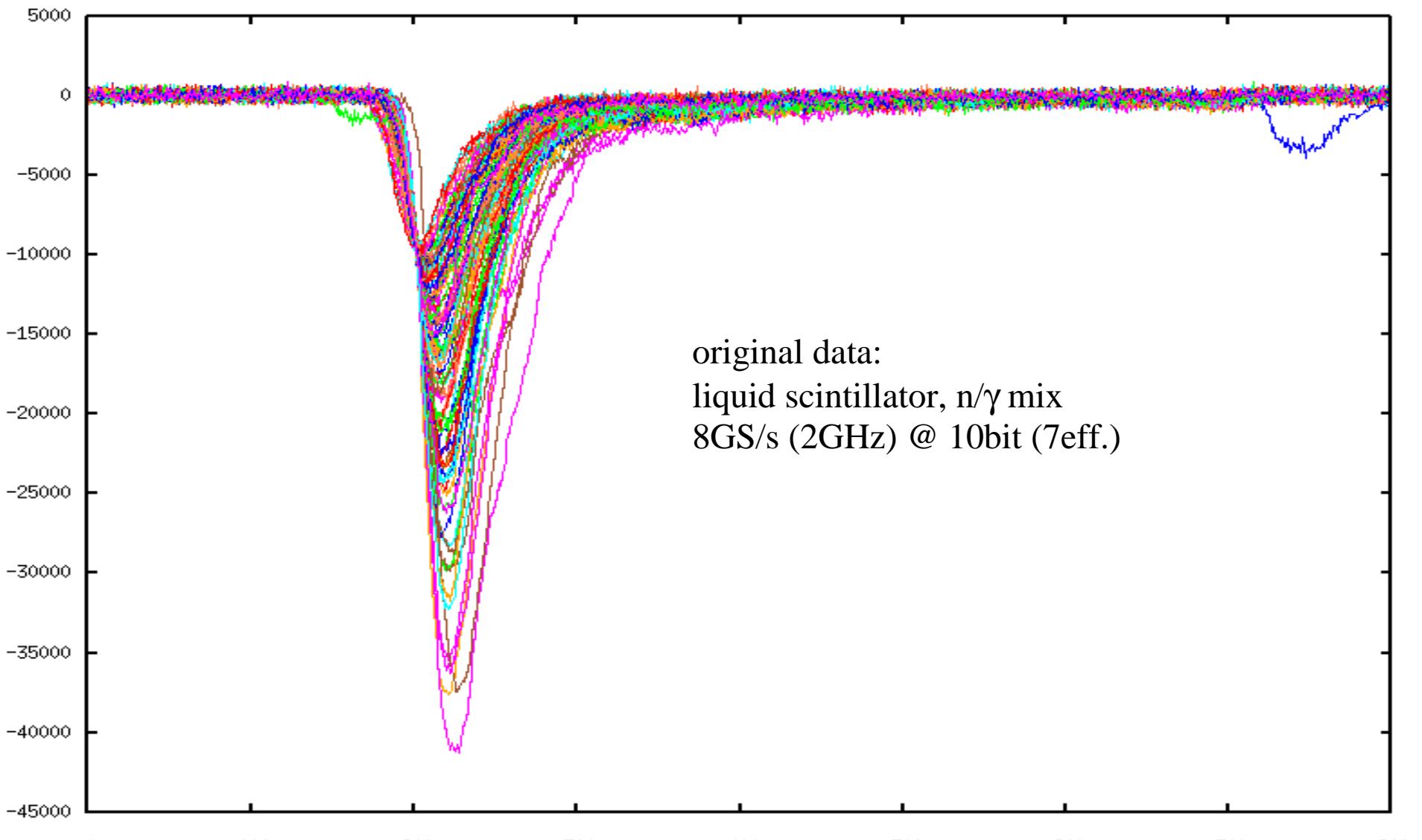


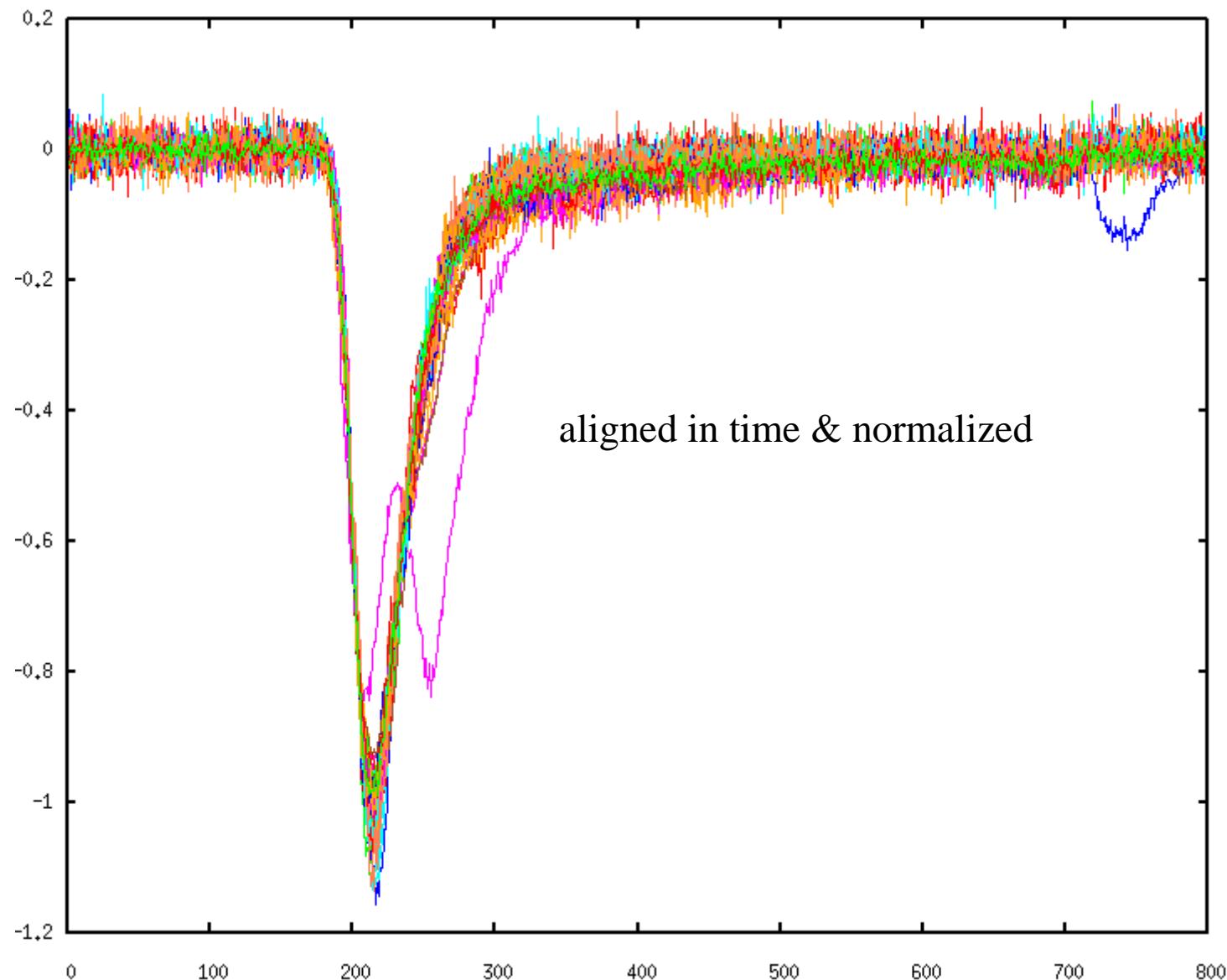


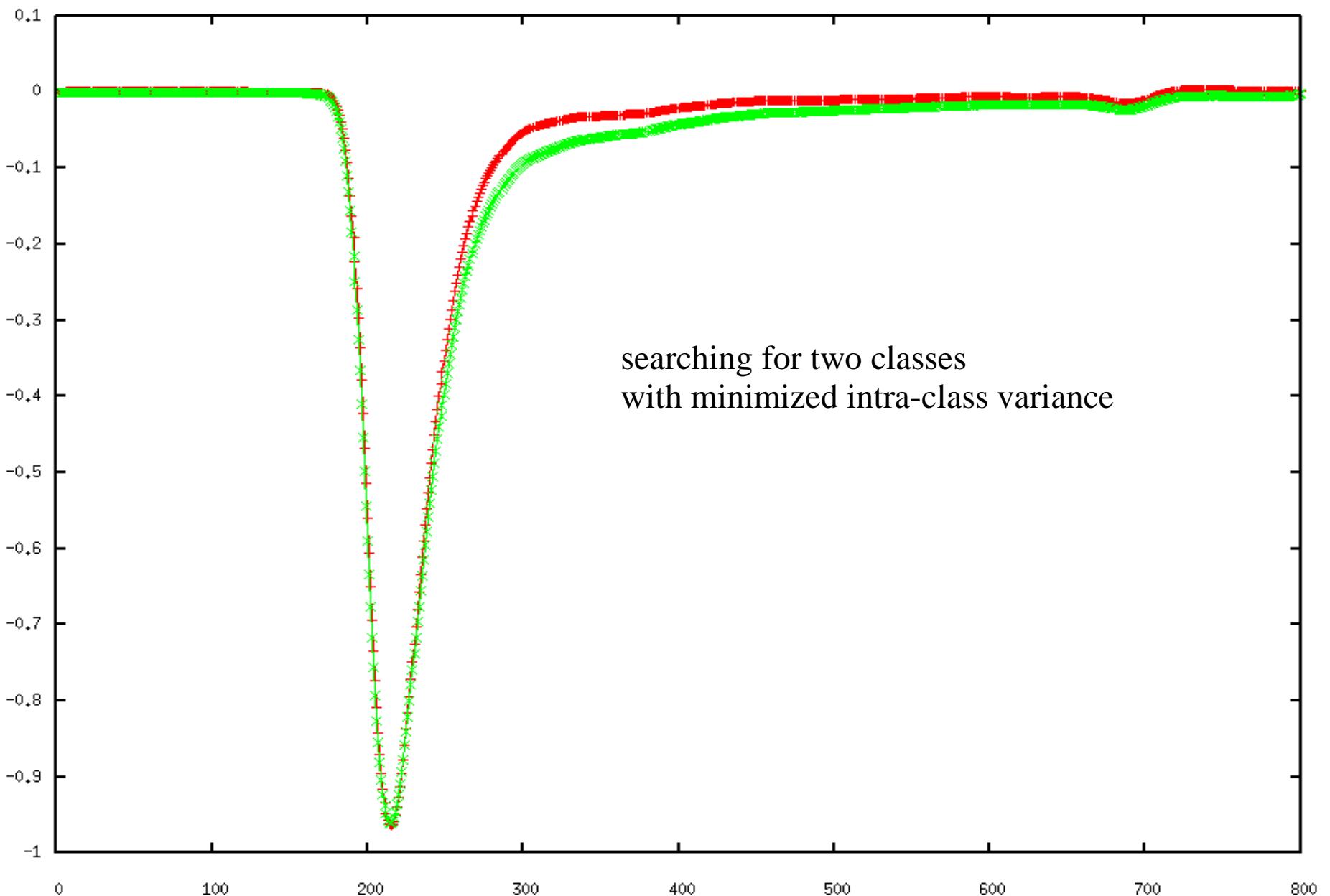
1000 events:

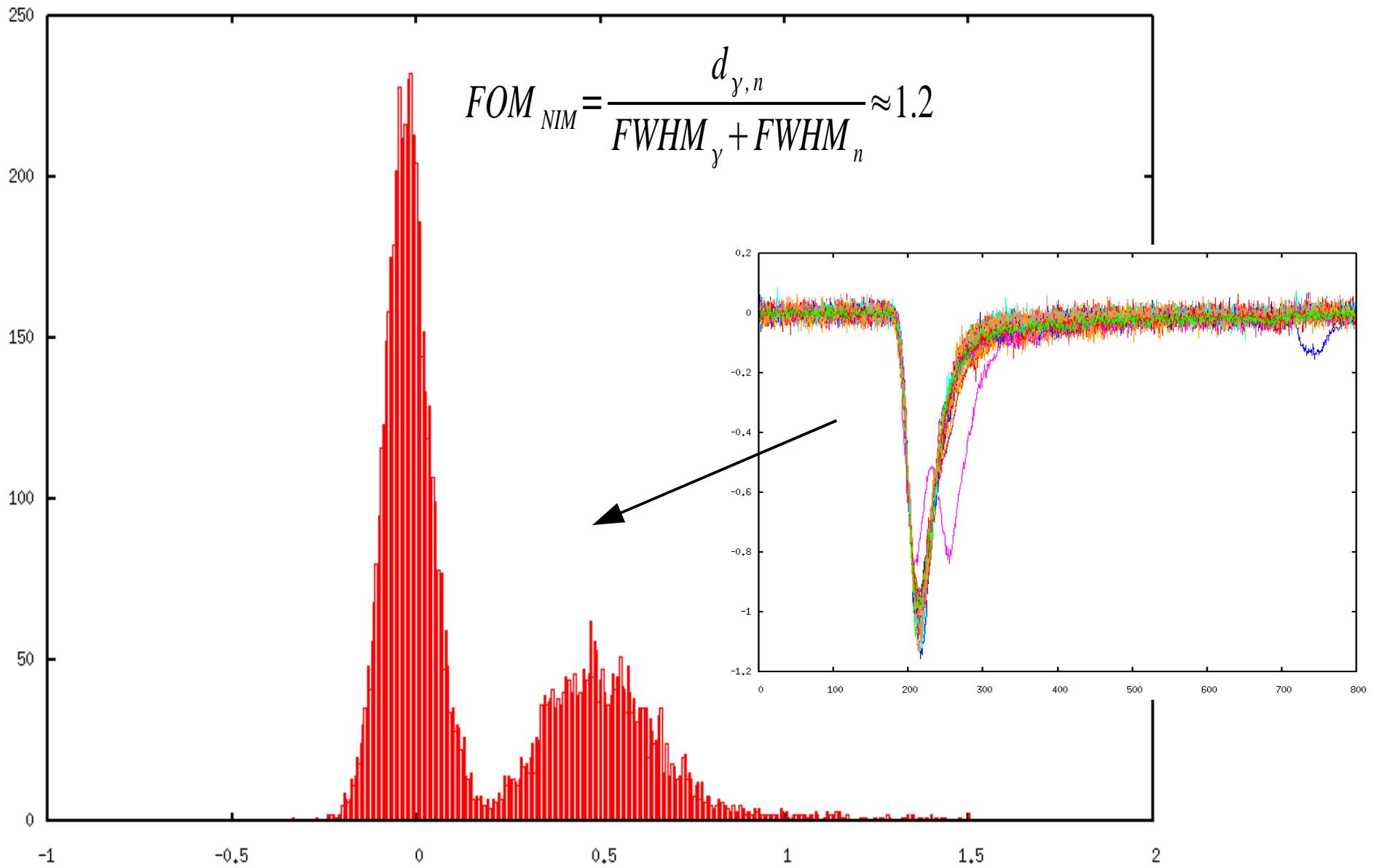


Example 3, automatic PSD









Thank you.



"It's no use the signal's too weak."

- Some limitations are fundamental,
- we can deal with all the others.