MBHA001 – Spikes Investigation
- on the “symmetry” of Flux-Jumps

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Thanks to: Maria Baldini (Brookhaven National Laboratory)

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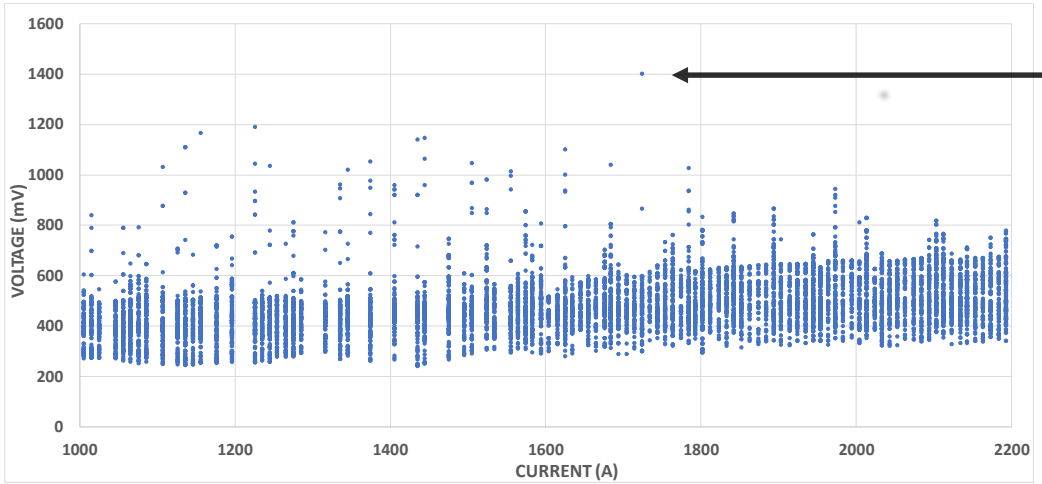
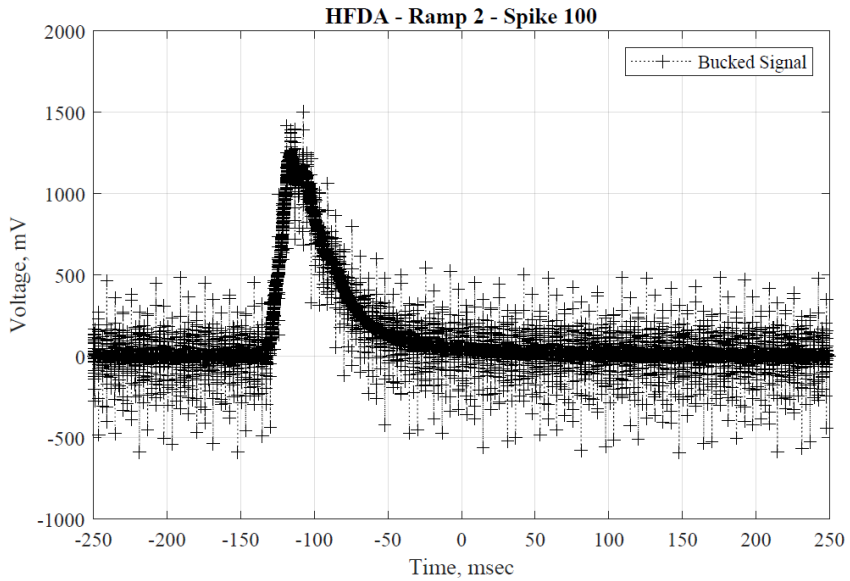
MQXFPA2 Test Results - Flux Jump Spikes



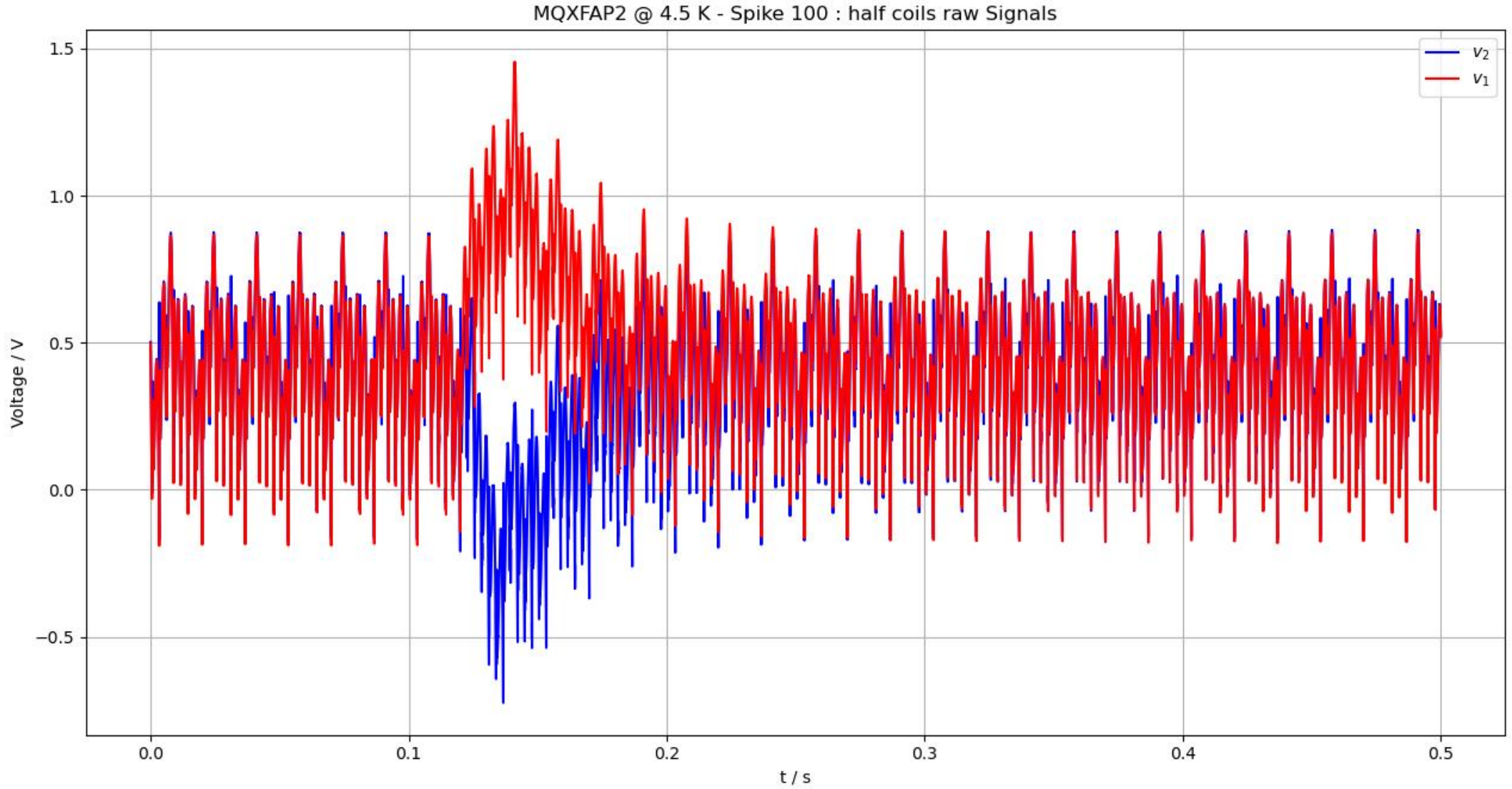
1400 mV spike at 1724 A during a 6000 A ramp



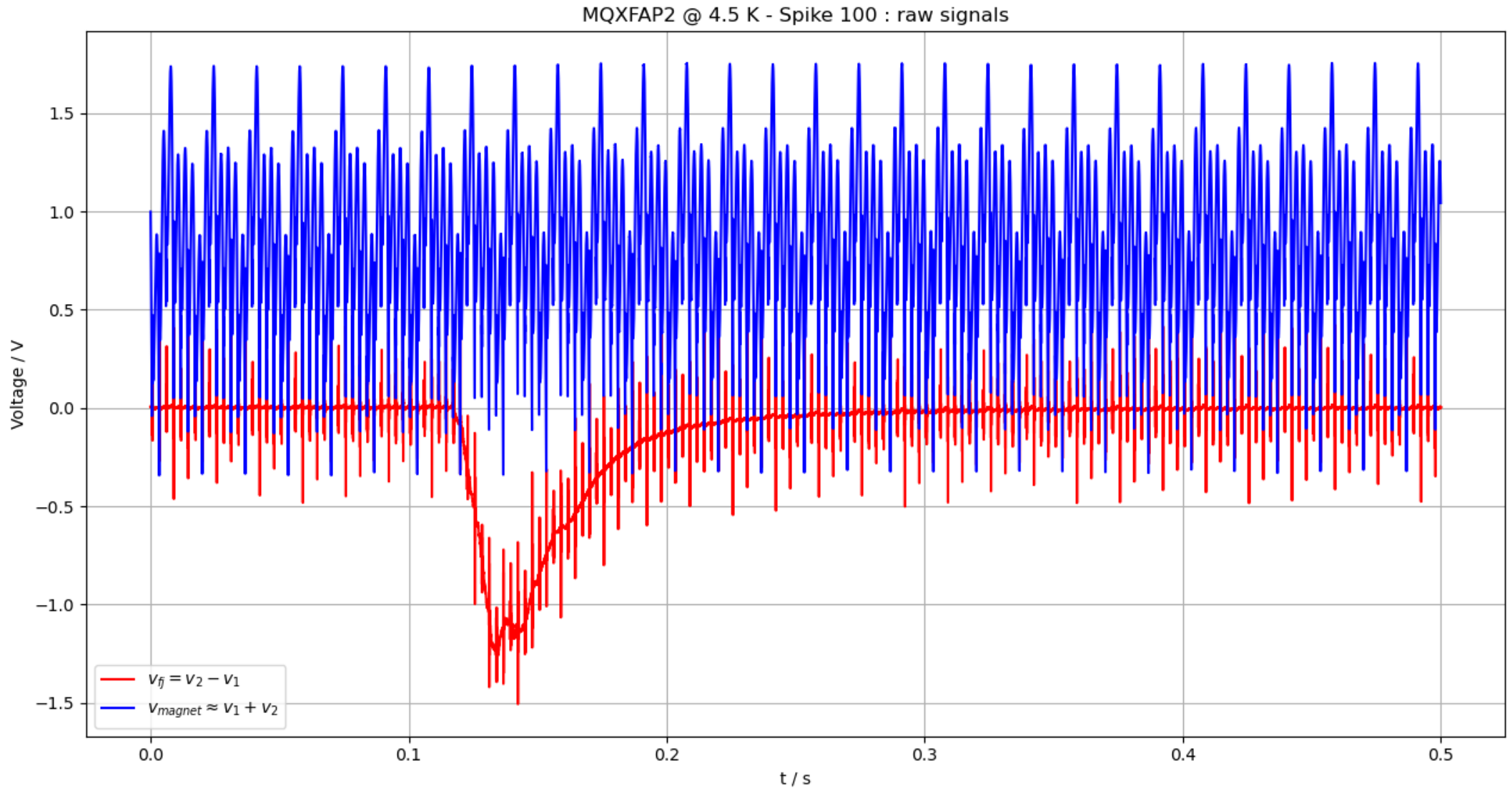
Plot by M. Baldini

8th HL-LHC Collaboration Meeting CERN Oct 2018

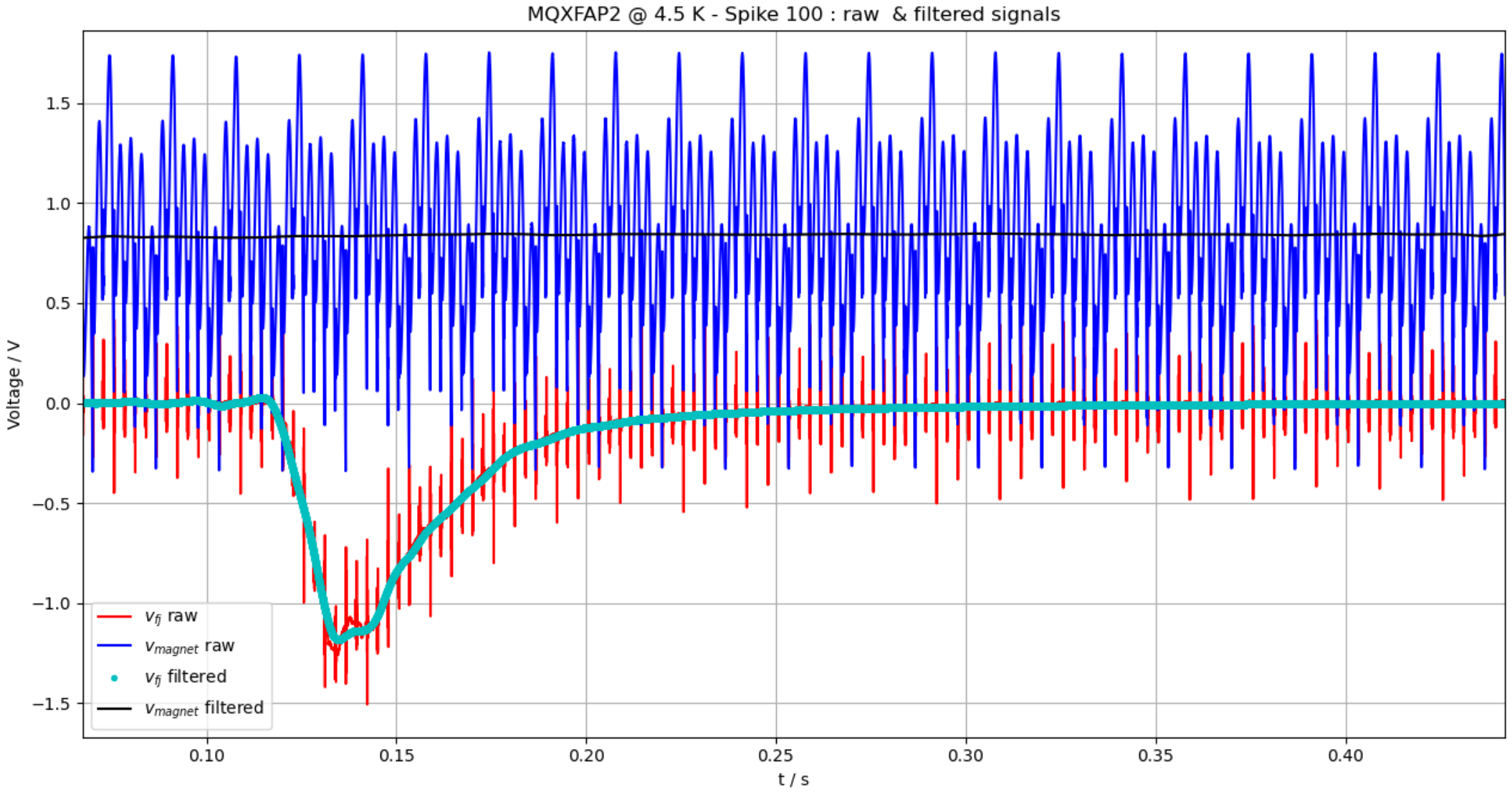
MQXFPA2 – Half coils signals – Spike 100 @ 4.5 K



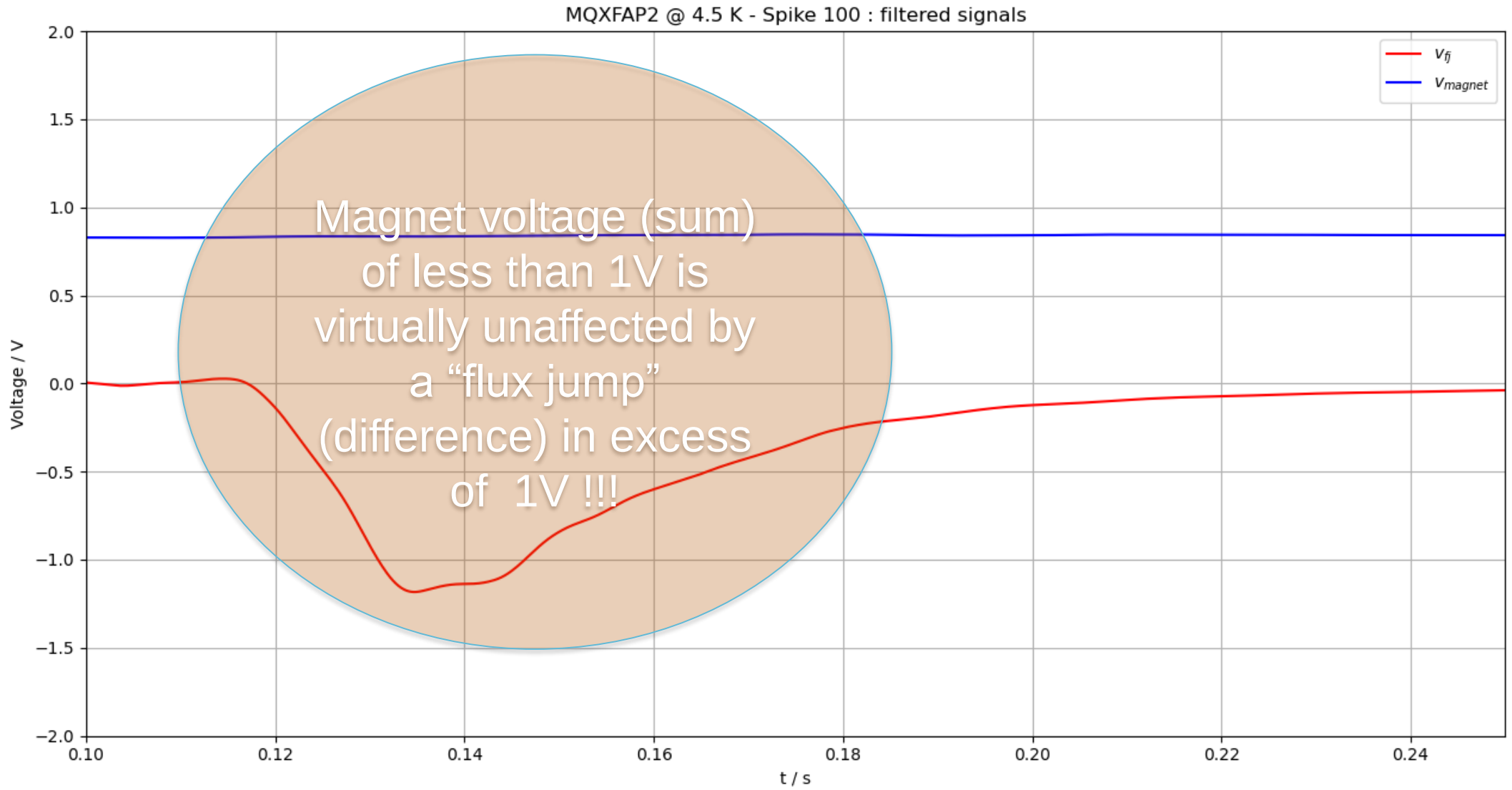
MQXFPA2 – Magnet and “FJ” signals – Spike 100 @ 4.5 K



MQXFPA2 – Magnet and “FJ” signals – Spike 100 @ 4.5 K



MQXFPA2 – Magnet and “FJ” signals – Spike 100 @ 4.5 K

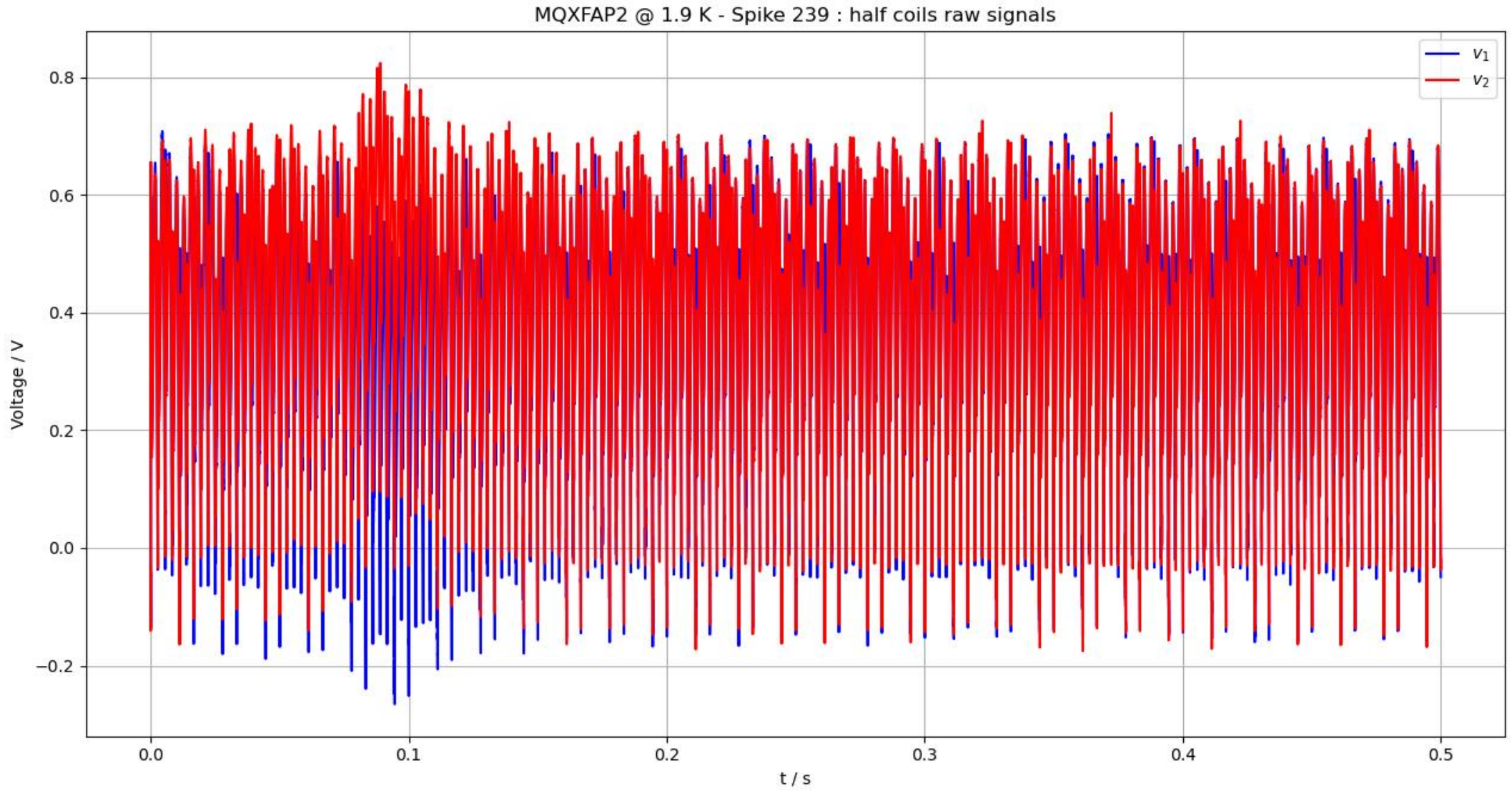


Conclusions

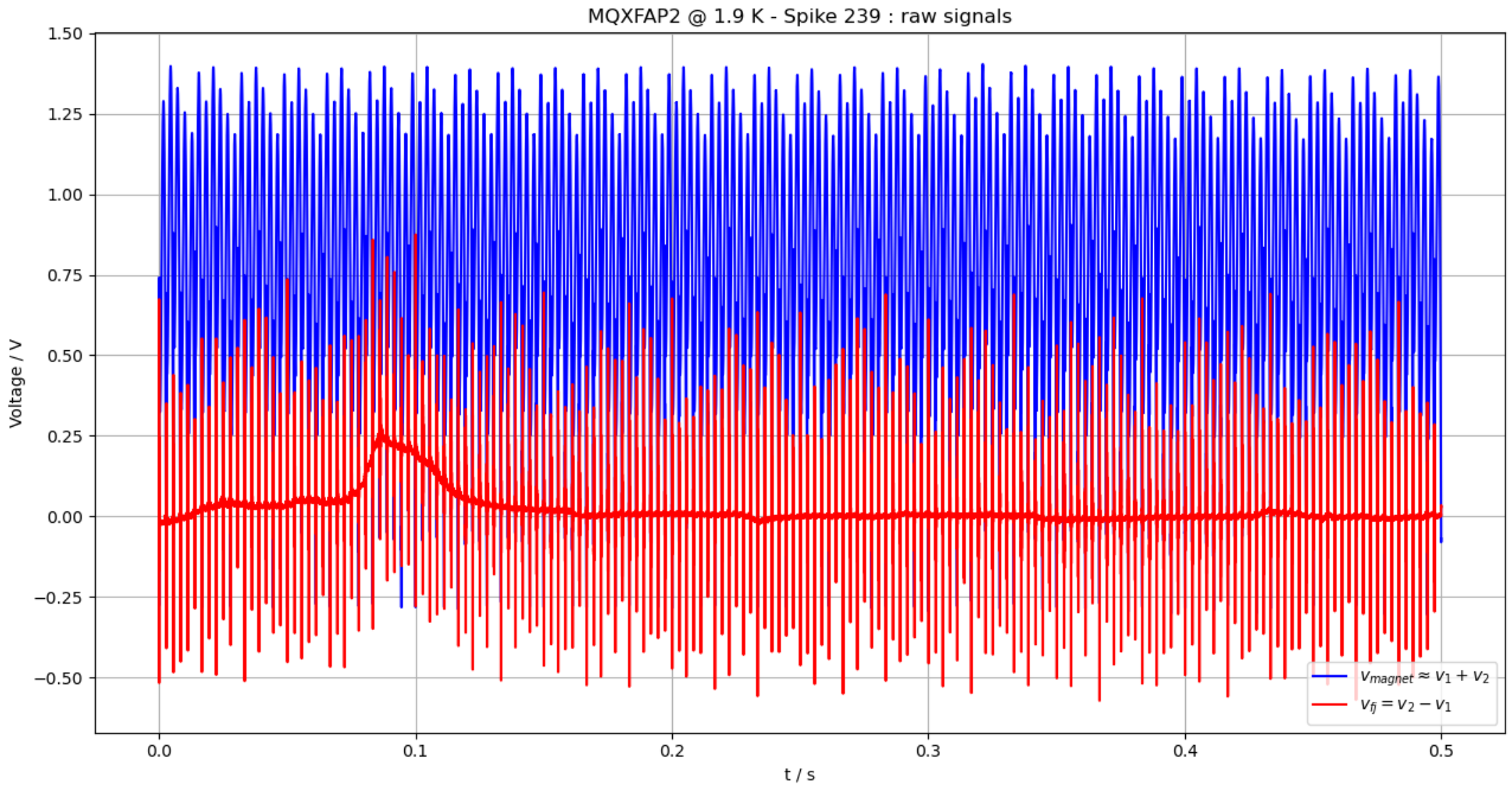
- Interpretations and open questions
  - The same “symmetry” shows up with Spike 239 at 1.9 K (additional slides)
  - It is quite puzzling that magnet voltage seems completely unaffected:
    - however one can think that the Power Converter is “imposing” the magnet voltage hence it is normal that “flux jump” does not show up there
    - even if very noisy (60 Hz and harmonics) the PC might still be rejecting perturbations in much lower frequencies where most of the energy of the flux jump is
  - For the MBHA001 spikes however:
    - the PC is not imposing the voltage, but symmetry might still not point against FJs
    - the spikes energy is at much higher frequencies, however the $\frac{\mathrm{d}i}{\mathrm{dt}}$ is now orders of magnitude larger than for “known” flux-jumps …
  - Big question is: is there still Nb_3Sn in superconducting state somewhere?

Additional Slides

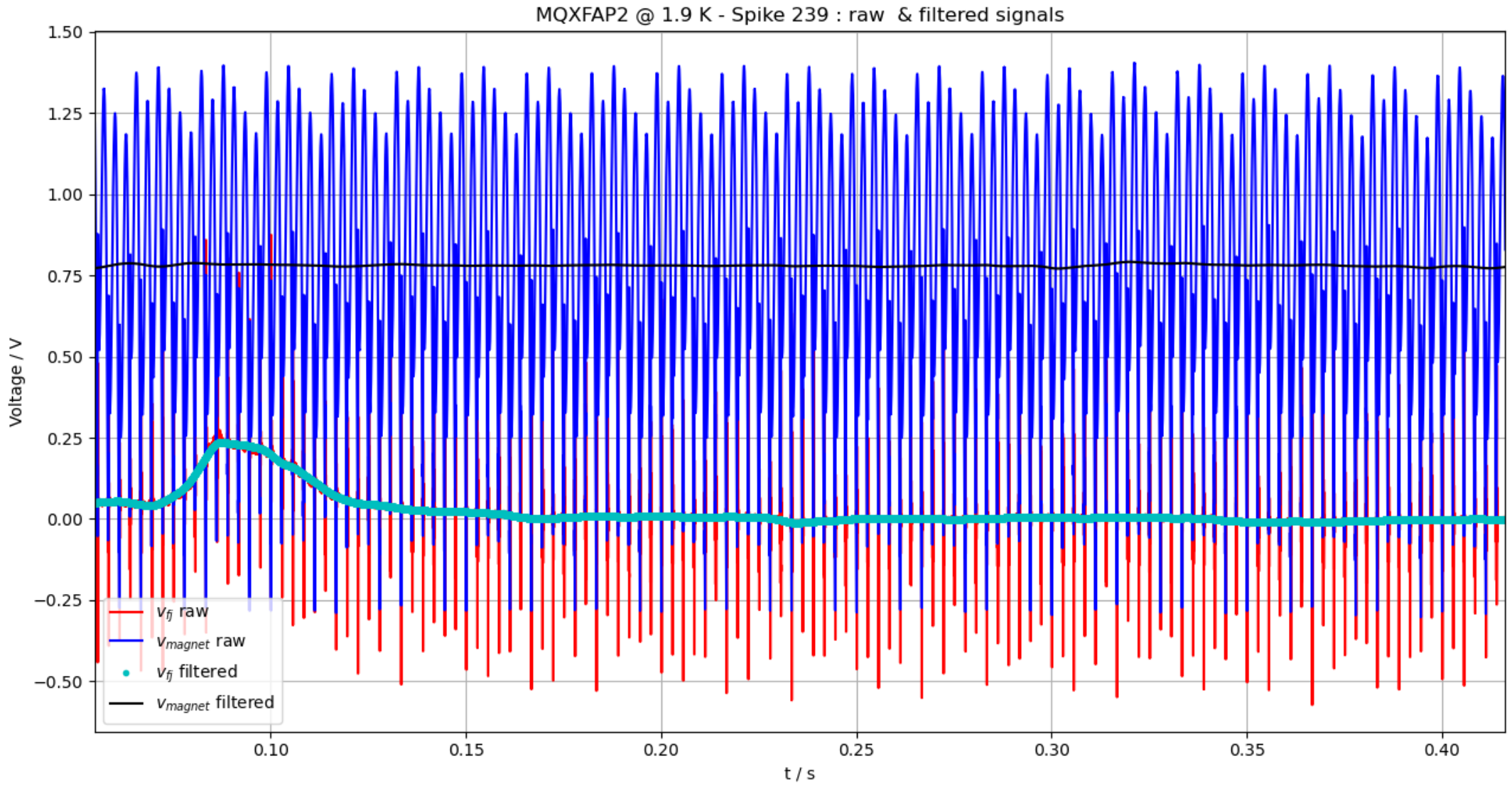
MQXFPA2 – Half coils signals – Spike 239 @ 1.9 K



MQXFPA2 – Magnet and “FJ” signals – Spike 239 @ 1.5 K



MQXFPA2 – Magnet and “FJ” signals – Spike 239 @ 1.9 K



MQXFPA2 – Magnet and “FJ” signals – Spike 239 @ 1.9 K