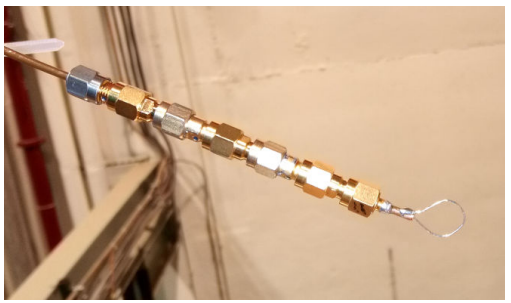
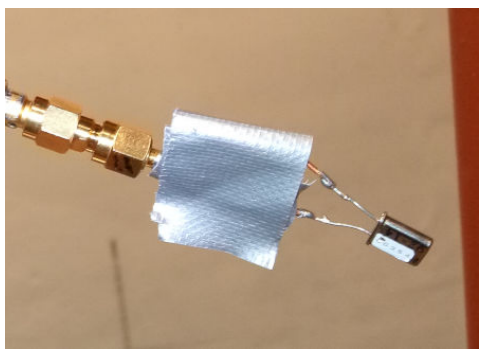
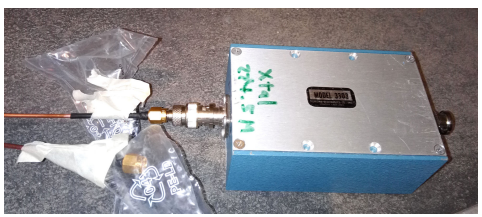
Measurement of NMR Noise Level

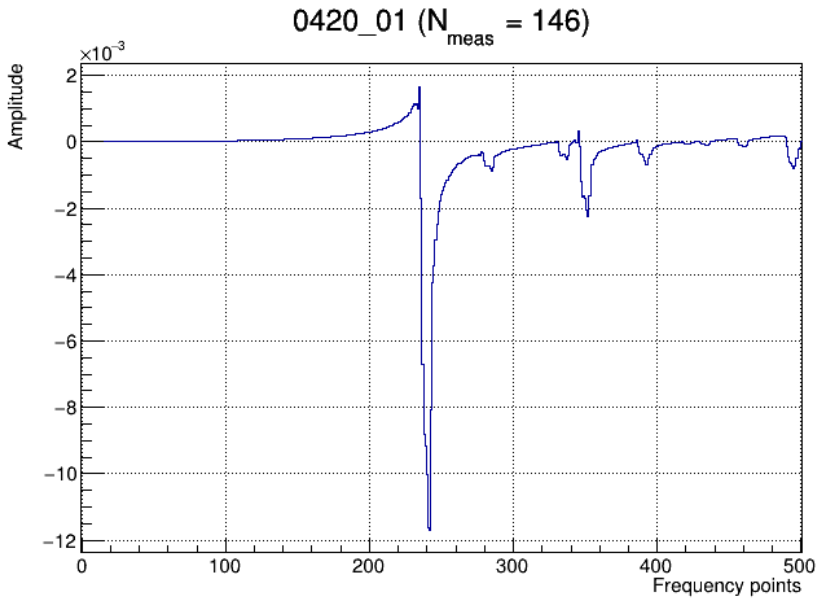
- NMR cables
  - "Short" $\sim 4 \cdot \lambda/2$
  - "Long" $\sim 18 \cdot \lambda/2$
  - The lengths will be measured precisely
- Crystal
  - "Simple" with tight & loose fits
  - "Big Box"
- Eight settings were tested on April 20 & 22
  - Shown in next pages
  - Any idea of other settings?

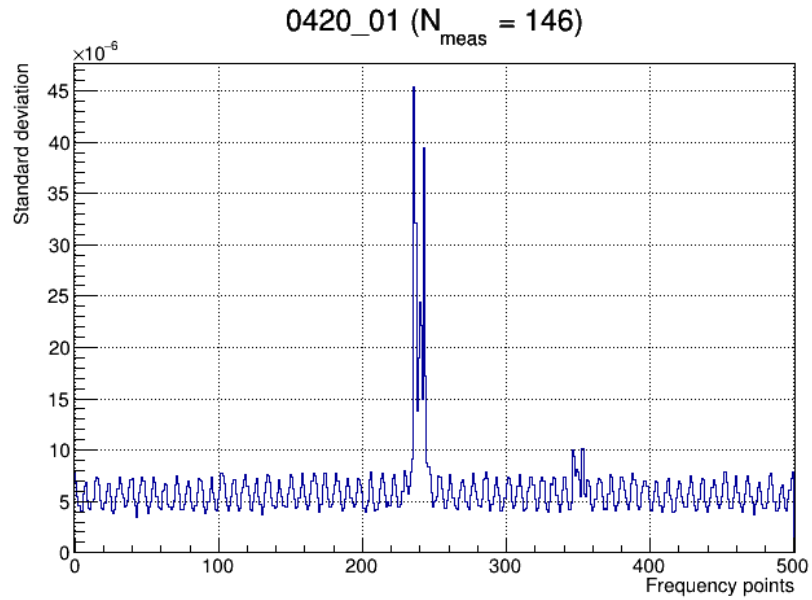






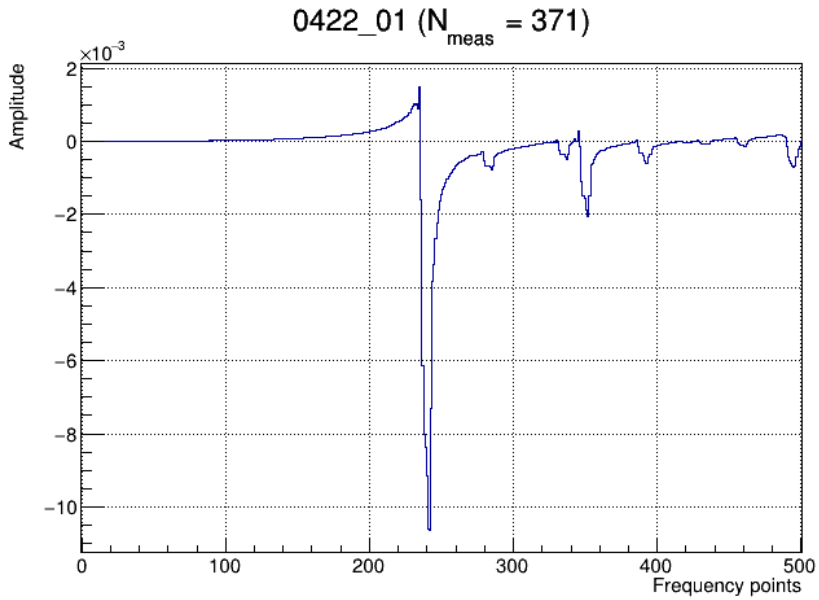
- 2022-04-20 #01
  - Cable = “Short”, Crystal = “Simple”

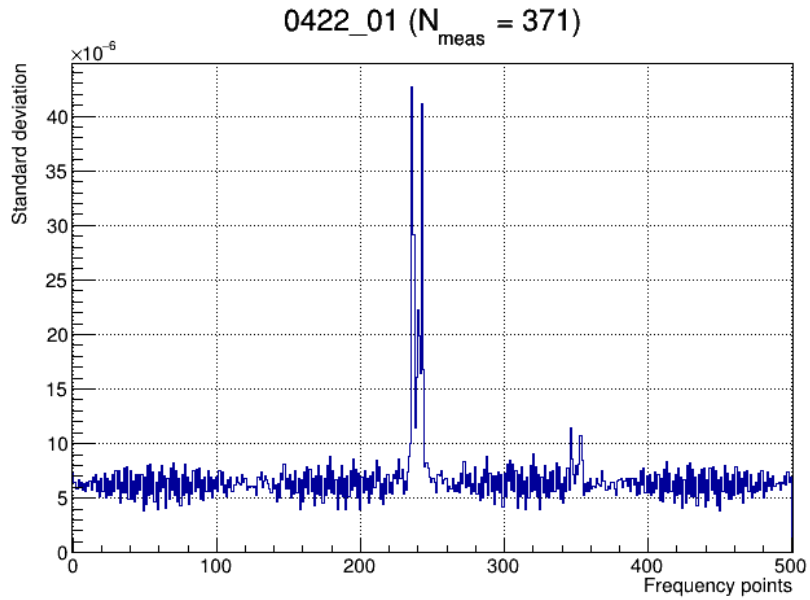




  - Noise level $\sim 6 \times 10^{-6}$

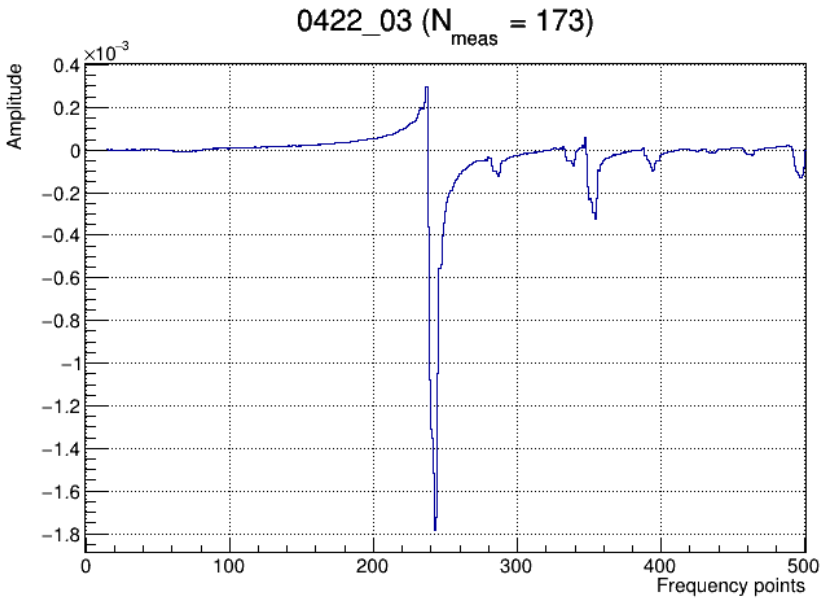
- 2022-04-22 #01
  - Cable = “Short”, Crystal = “Simple”

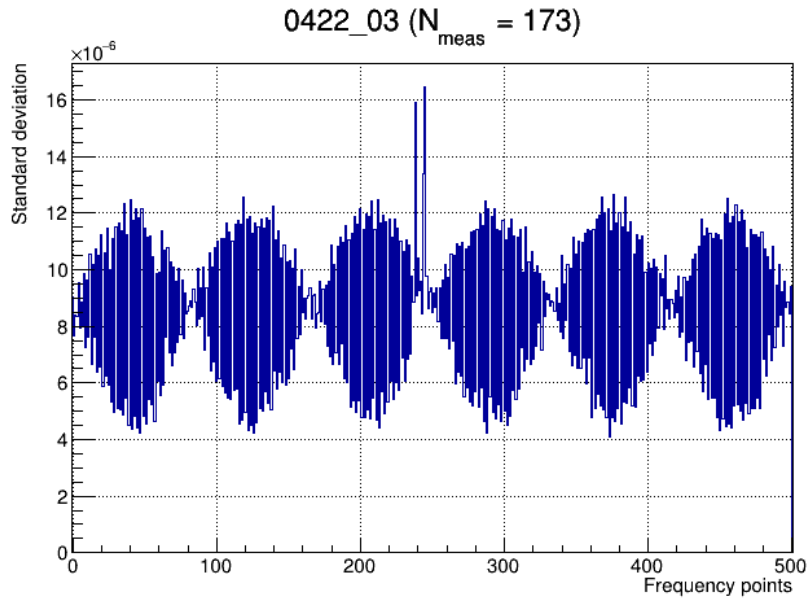




  - The setting is identical to “2022-04-20 #1” for reproducibility check
  - Similar noise level but different frequency components

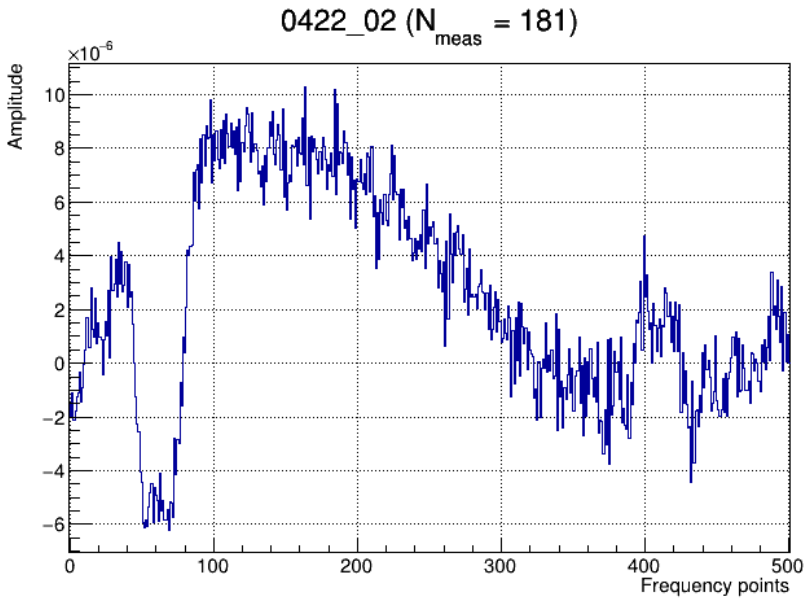
- 2022-04-22 #03
  - Cable = “Short”, Crystal = “Simple” with loose fit

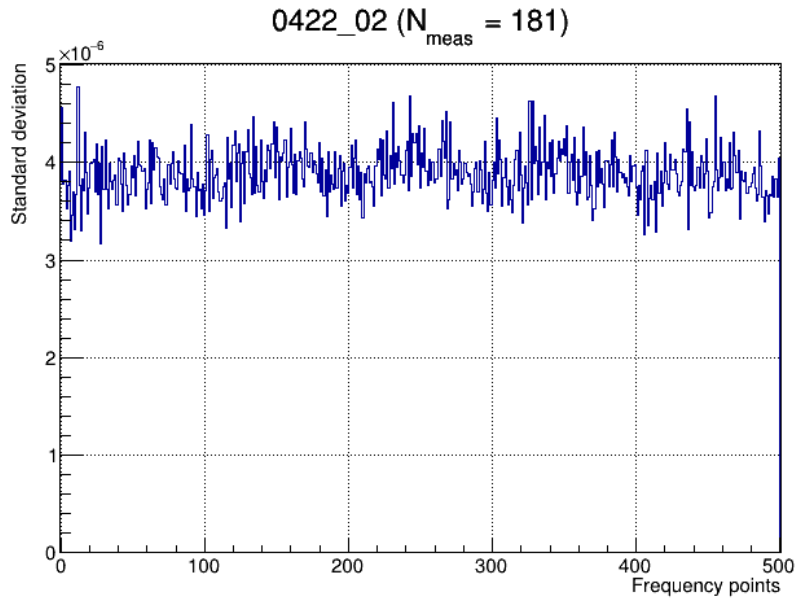




  - Noise level $\sim 8 \times 10^{-6}$. Higher

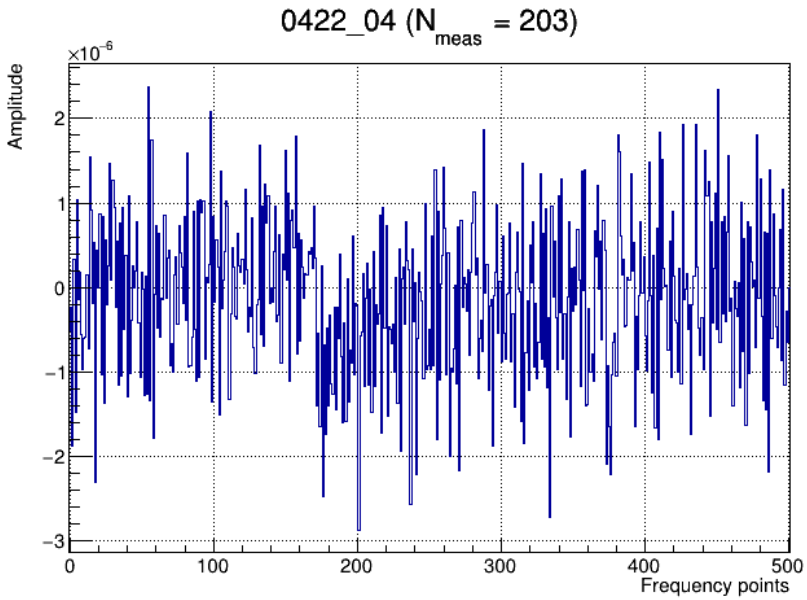
- 2022-04-22 #02
  - Cable = “Short”, Crystal = None

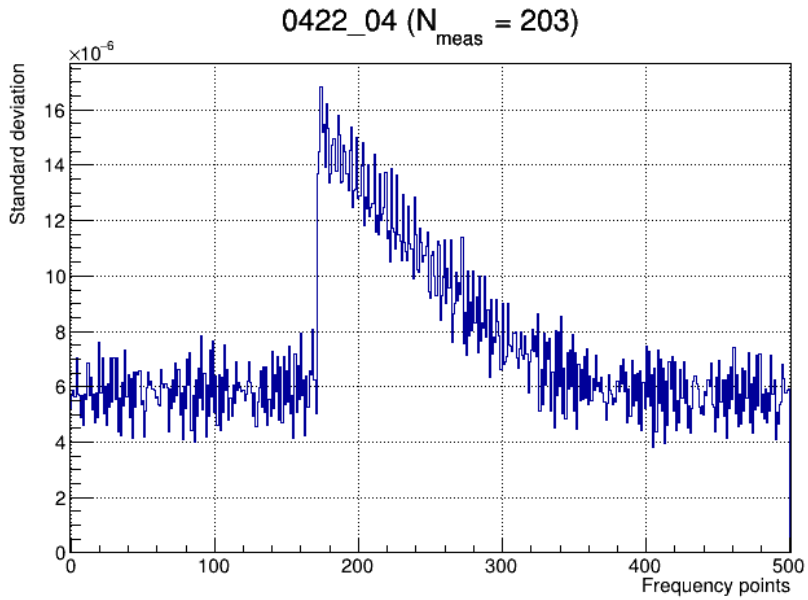




  - Noise level $\sim 4 \times 10^{-6}$. Lower

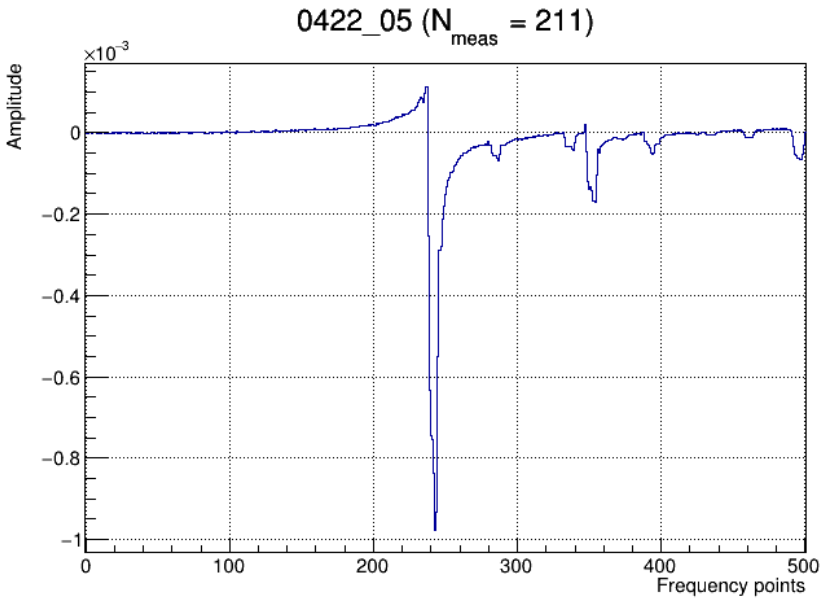
- 2022-04-22 #04
  - Cable = “Long”, Crystal = None

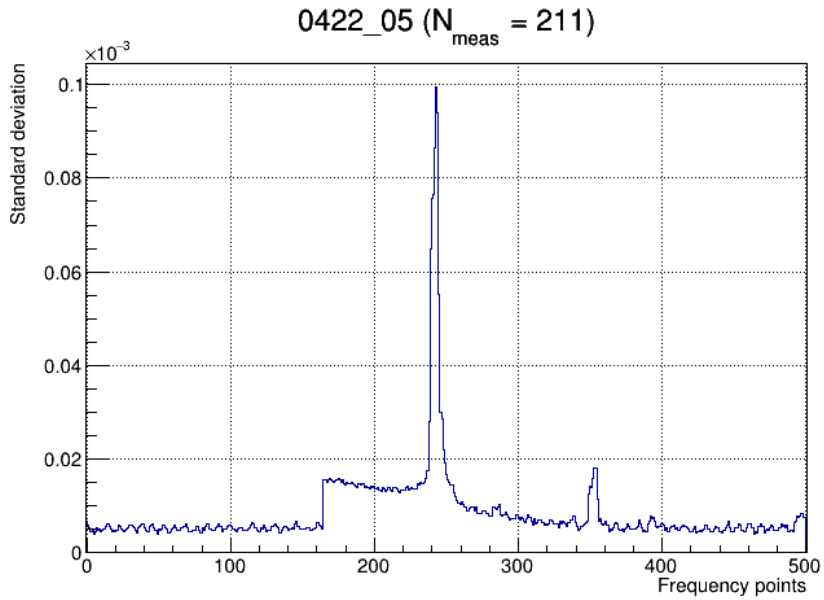




  - Noise level $\sim 6 \times 10^{-6}$. Similar to #02
  - Jump. Resonance on cable?

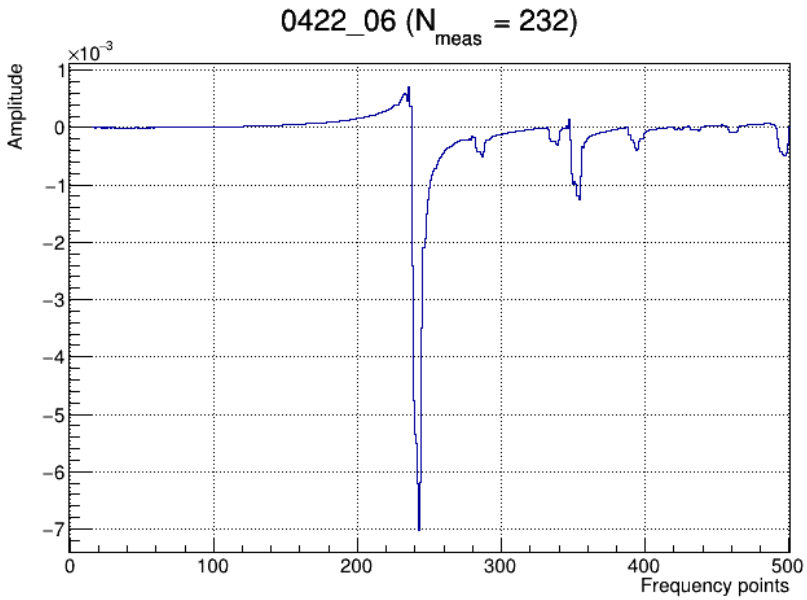
- 2022-04-22 #05
  - Cable = “Long”, Crystal = “Simple” with loose fit

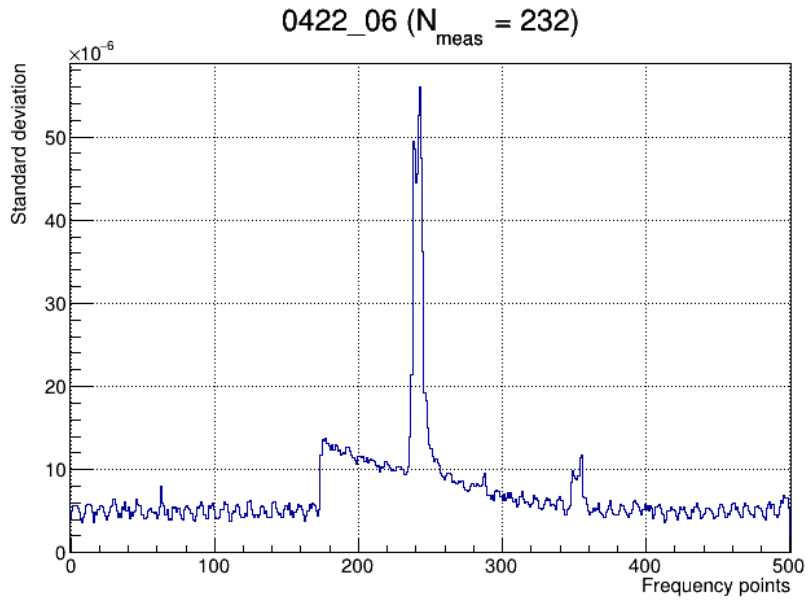




  - Noise level $\sim 5 \times 10^{-6}$. Similar
  - Similar jump

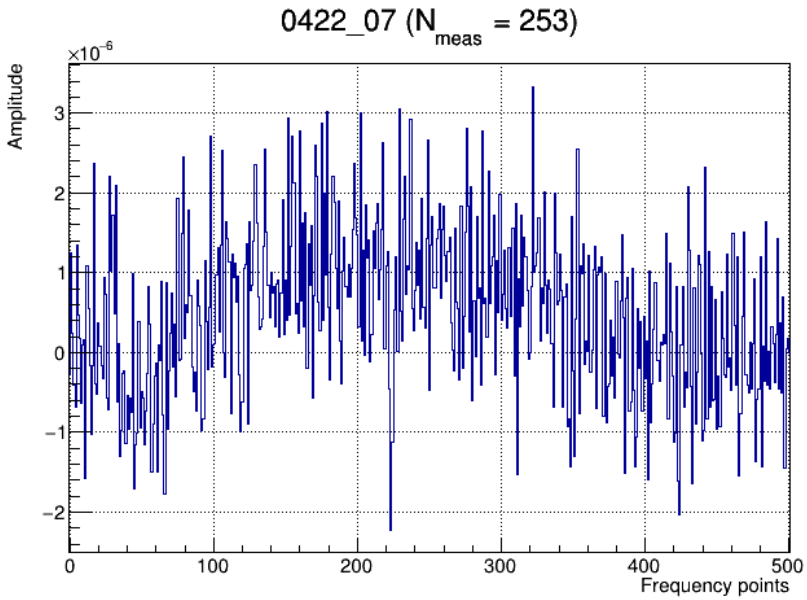
- 2022-04-22 #06
  - Cable = “Long”, Crystal = “Simple”

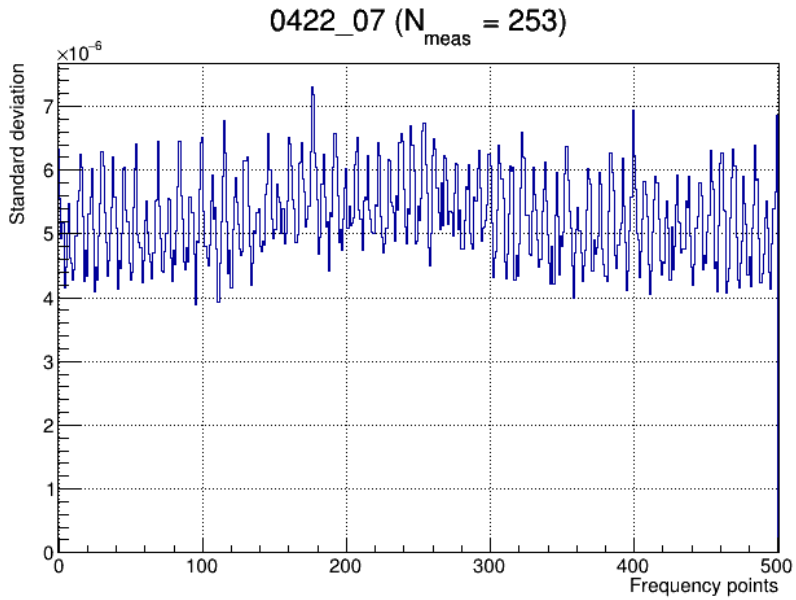




  - Noise level $\sim 5 \times 10^{-6}$. Similar
  - Similar jump

- 2022-04-22 #07
  - Cable = “Long”, Crystal = “Big Box”





  - Noise level $\sim 5 \times 10^{-6}$. Similar
  - No jump
  - No peak is seen
    because the resonant frequency of this crystal is different (224.47 MHz)