In the previous two lectures ('Future Interferometers' and 'QND') you have heard lots about fundamental noise sources. However, in reality most problems in commissioning and day-to-day running of the interferometers originate from a myriad of 'so-called' technical noise sources.

Therefore, I would like to give you at least a flavour of some of these noises and do a Quiz with you:

Real World Noise Quiz

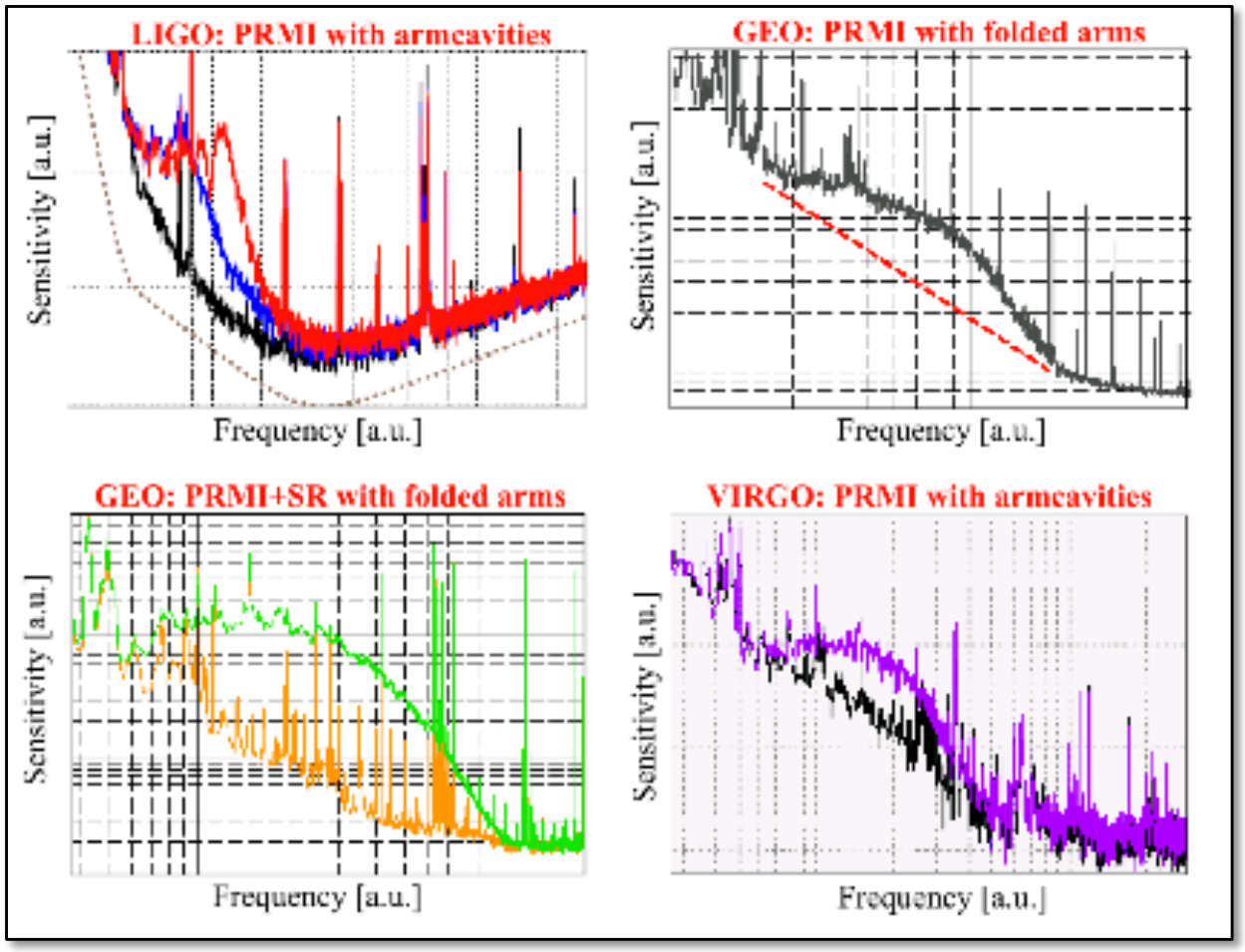
Real-World Noise Quiz 1

- Listen to the following two audio-files. The first one comes from a GW detector in normal condition. The second features excess noise?


- What is the origin of this noise?
  - A) High waves on North Sea hitting the coast of northern Germany?
  - B) Scattered light from a photodiode?
  - C) Wind shaking the buildings of GEO600?
  - D) A broken capacitor in the frequency stabilization servo?

Real-World Noise Quiz 1 (Solution)

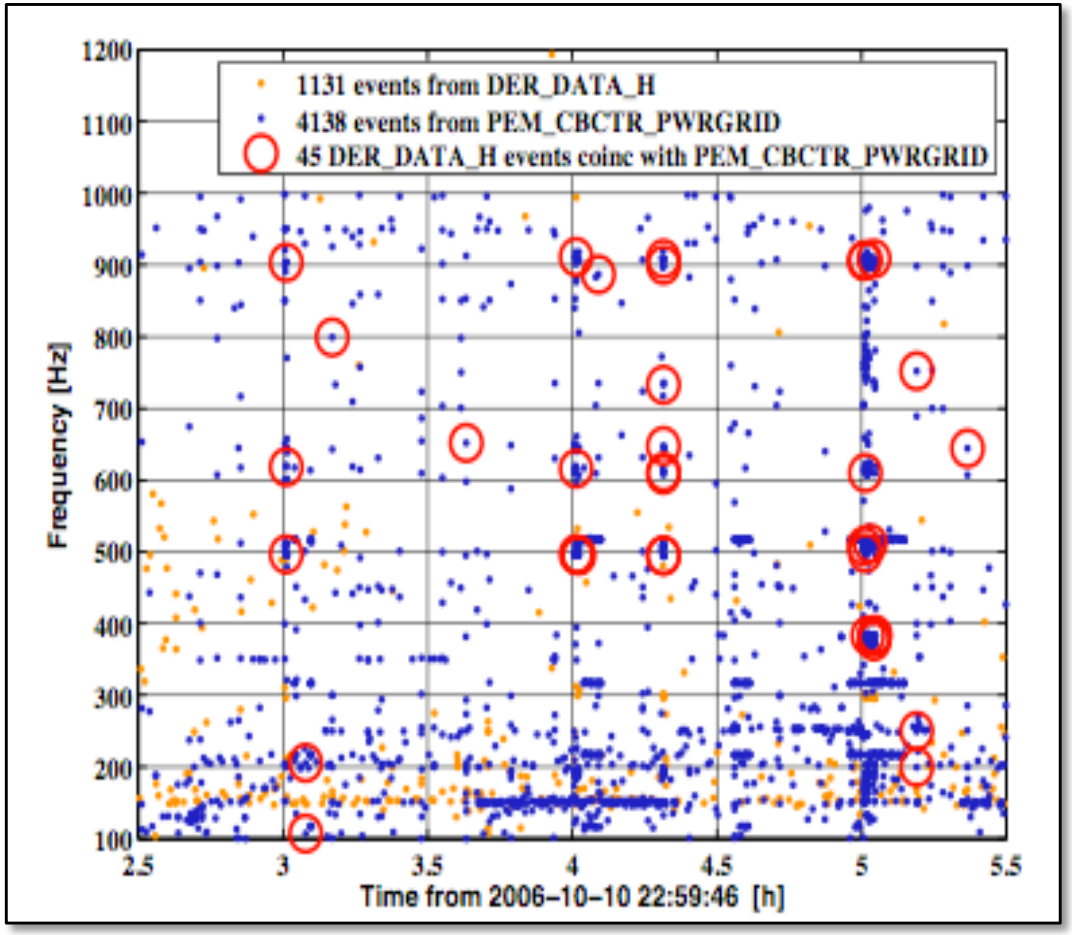
- This sound is characteristic for scattered light noise.
- Scattered light noise is problem that all current GW detectors suffered from during commissioning periods ….



Noise hunters Quiz 2

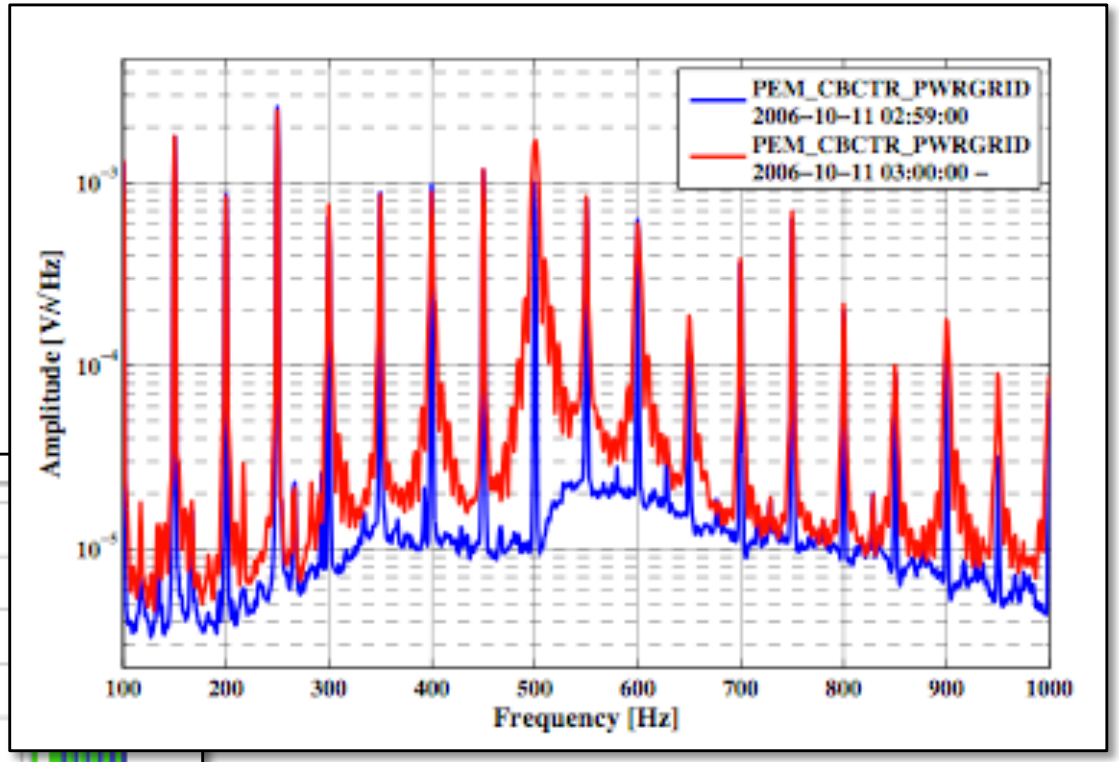
- We found coincidence glitches between the h(t) channel and the power grid monitor. Many of these occurred close to hour boundaries.

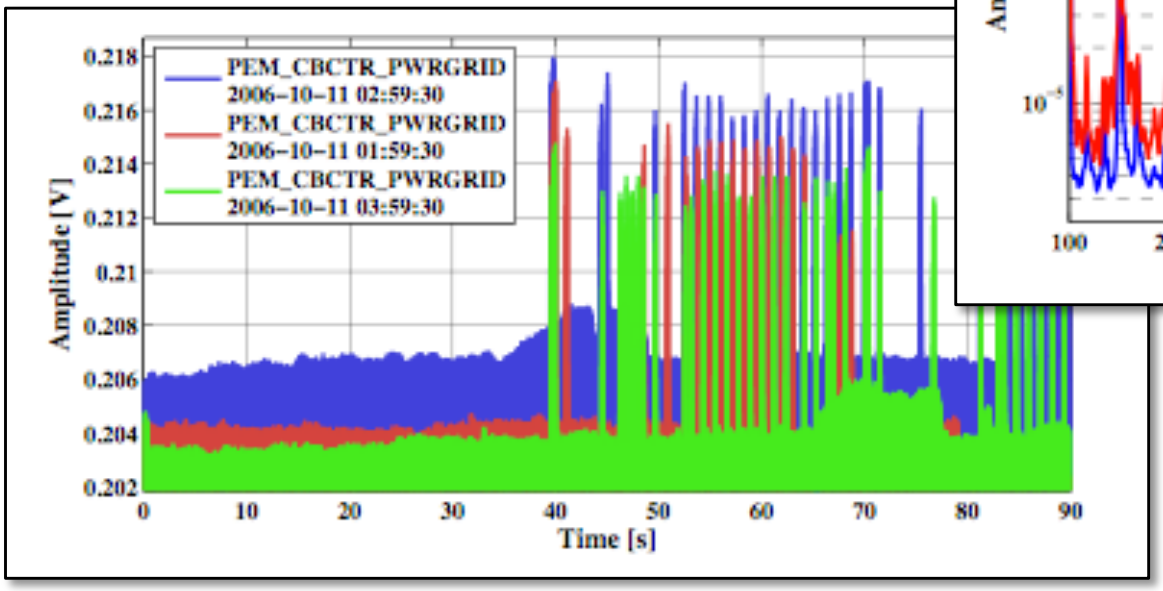
- What could be the cause of these glitches?
  - A) Pickup noise from the GPS receivers?
  - B) Control signals for street lamps in Ruthe?
  - C) The hourly synchronisation of the internal clocks of the frameserver-computers?



Noise hunters Quiz 2 (Solution)

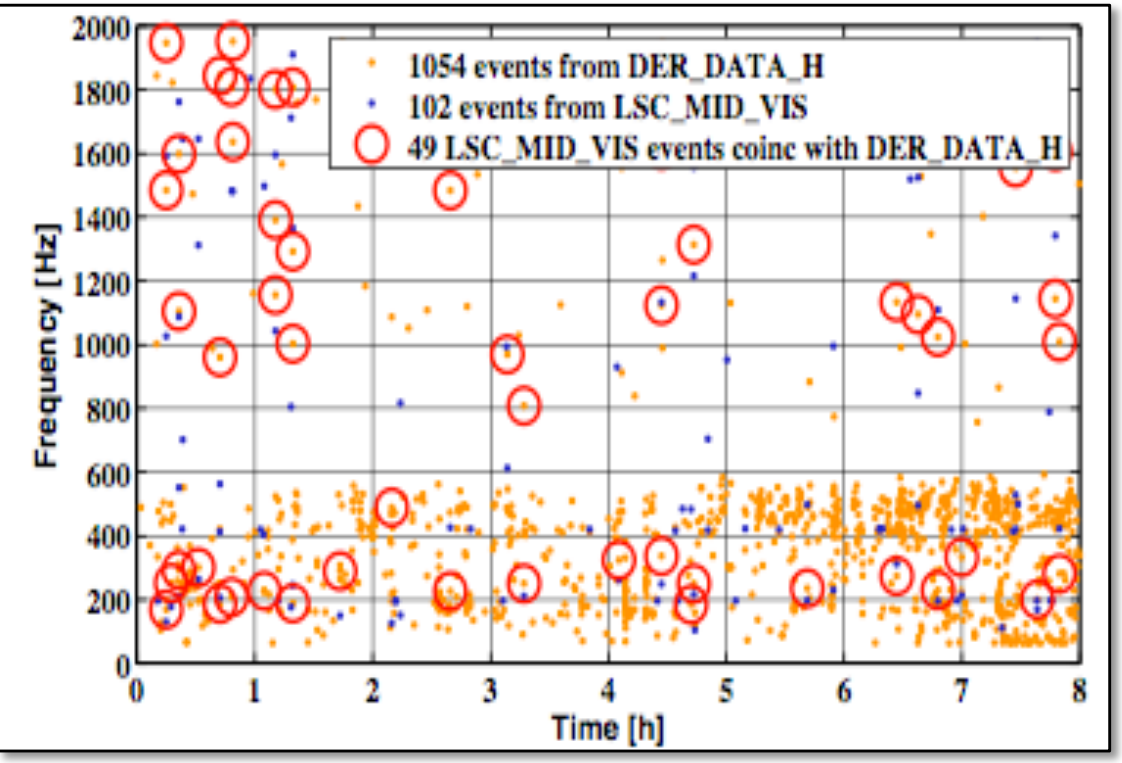
- B) is correct.
- The electricity suppliers add modulation signals onto the 50Hz signal to control streetlamps and tariffs for electrical heating.

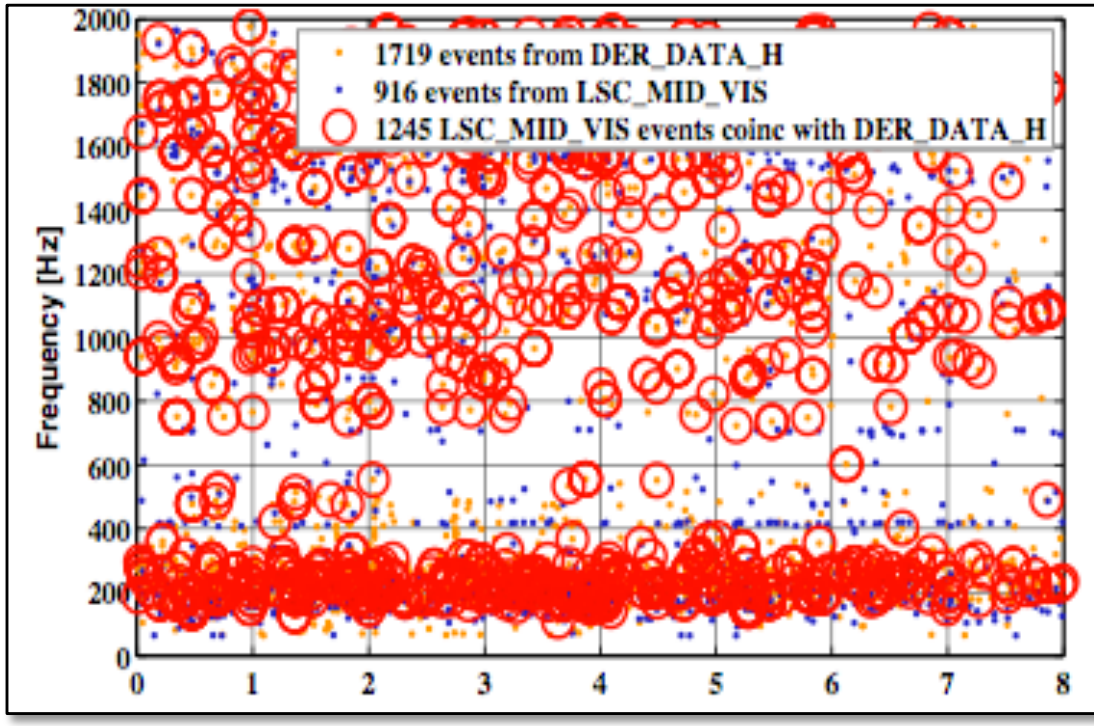




- Coupling via magnetic fields to the mirror magnets.
- Problem is solved now! ☺

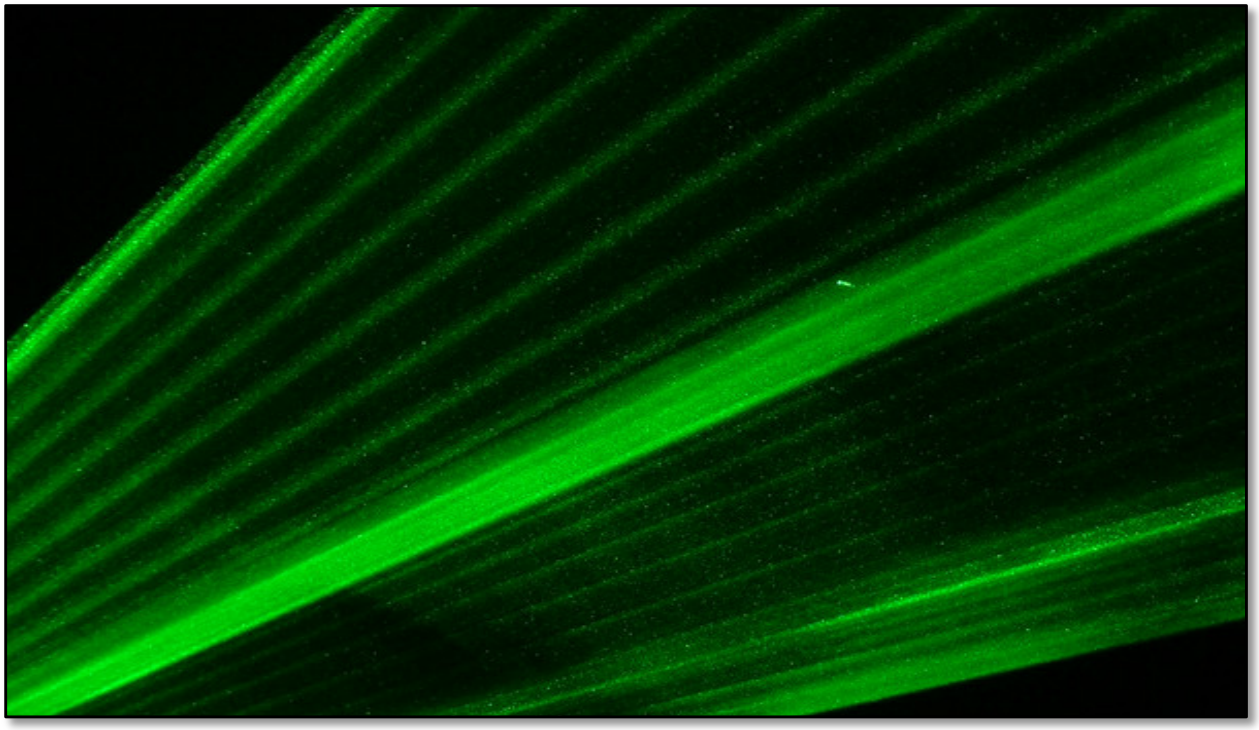
Noise Hunters Quiz 3





- We find a correlation between the (DC) light power on the main photodiode and the h(t). What changed between the left and the right plot? - any idea ?

Noise Hunters Quiz 3 (Solution)

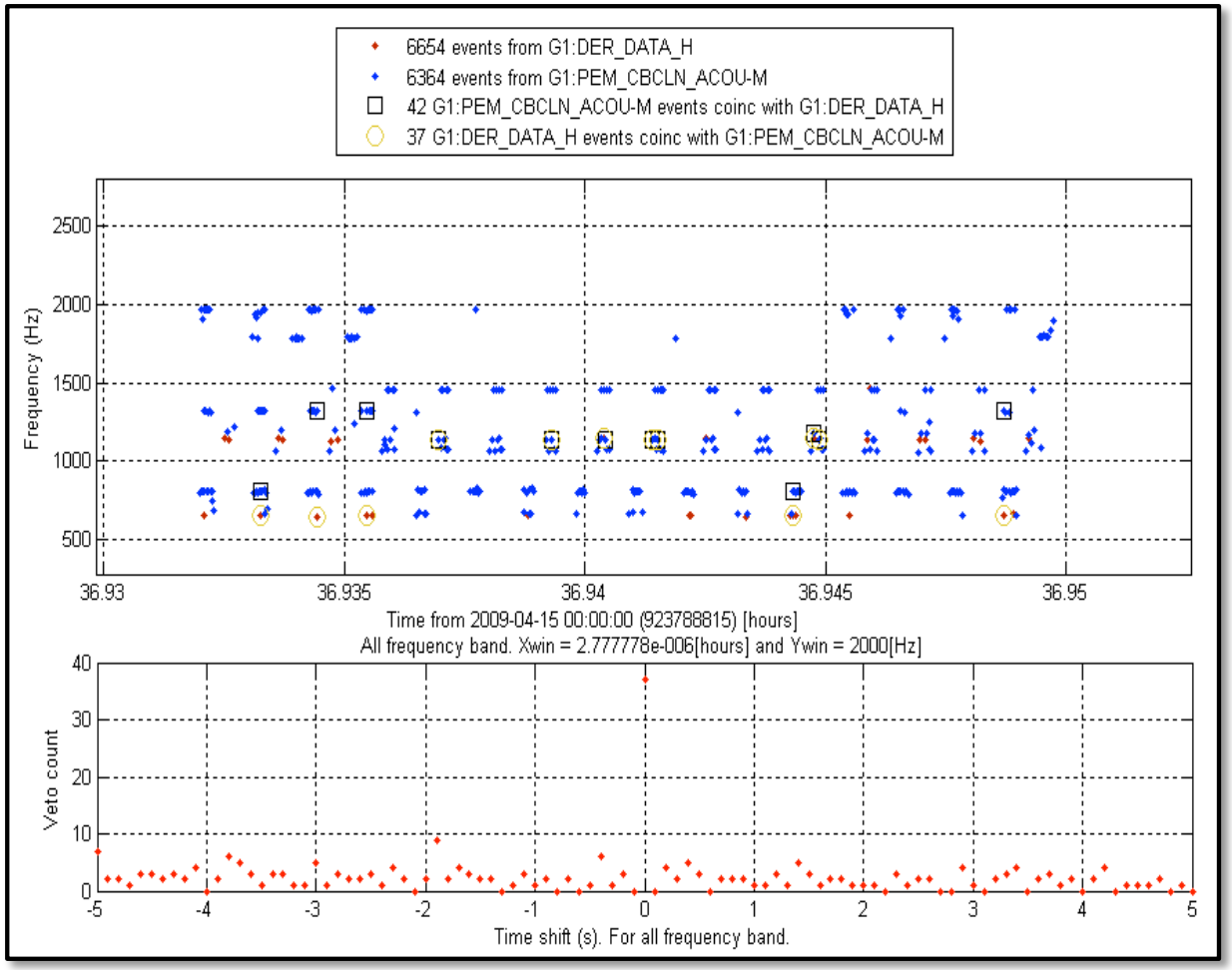


- The glitches were caused by dust particles falling through the laser beams.
- The two plots showed periods of different dust concentration in the central ‘clean’-room of GEO600.

Noise hunters QUIZ 4

- One class of strange noise events showed up as coincident glitches in h(t) and in a microphone.
- Can you hear anything in h(t)?

- Any idea what this could be?

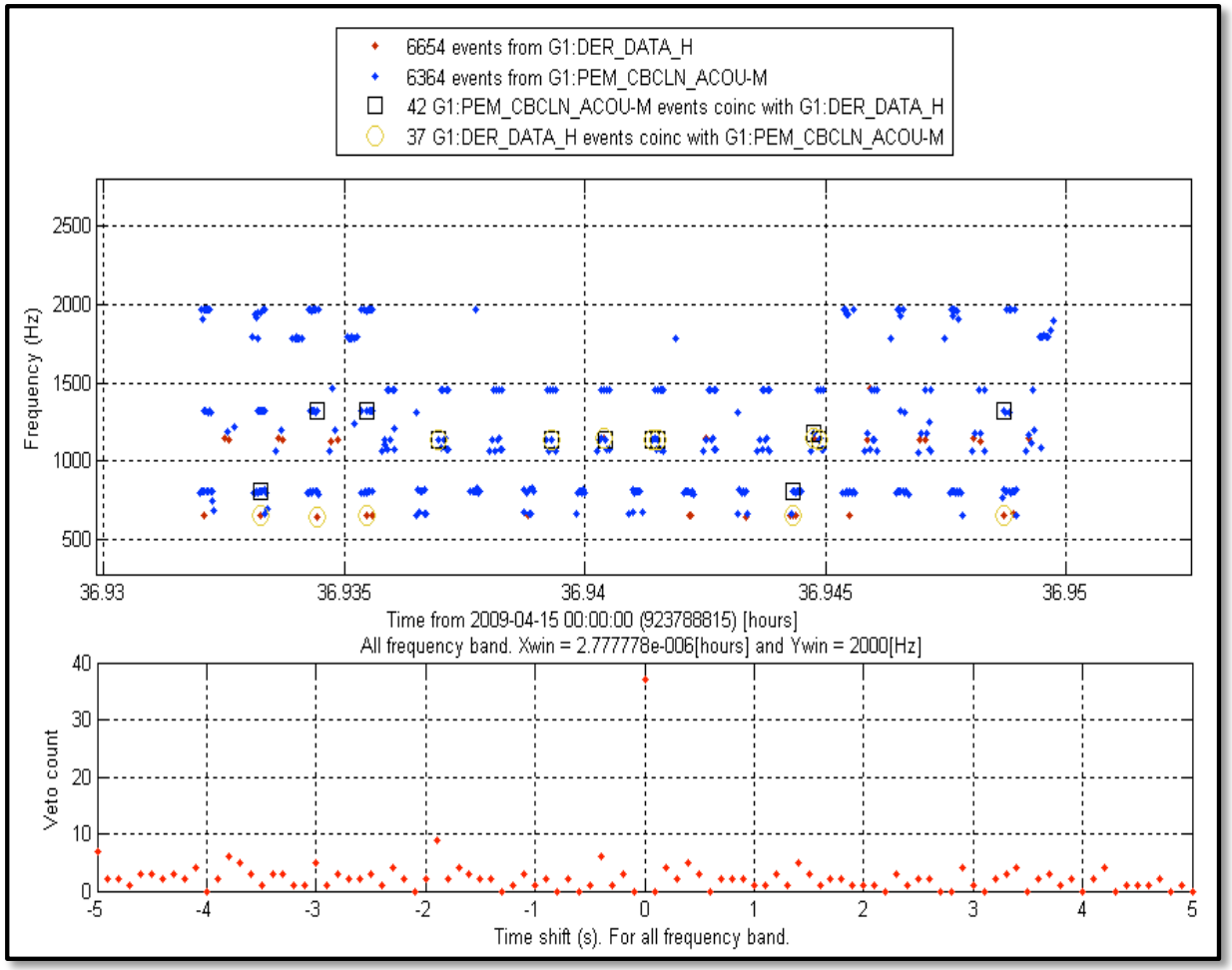


Plots and audio files courtesy Borja Sorazu (IGR)

Noise hunters QUIZ 4 (Solution)

- Listen to the microphone data. It is rather obvious …

- Yes, it is a telephone ringing in the central cleanroom of GEO600 ☺



Plot and audio files courtesy to Borja Sorazu (IGR)