TRANSIENTS WITH NENUFAR

Few inputs for the discussion

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TWO FLAVOURS OF TRANSIENTS

- **Incoherent synchrotron emission**
  - Relatively slow variability (>> seconds)
  - Associated with all explosive events
  - Strong potential for MW astronomy

- **Coherent emission**
  - Relatively fast variability (<< seconds)
  - Usually associated with pulsars?
  - Often highly polarised

Detection: images

Detection: time series

Expertise/Interests: Saclay, OCA?

LPC2E, OP, Saclay?, ??

See SKA-LOFAR radio days for more details
LANEWBA: A NEW DEDICATED BACKEND

LaNewBa

2*96 analog signals

2*96 complex voltages

8 digital beams bW: 6 MHz
channels: 200 kHz

ARTEMIS

Super-ARTEMIS?

Correlator?

2 digital beams bW: 70 MHz
channels: 100 kHz? 200 kHz?

NenuFAR

2*96 complex voltages

correlations (16)^2 pixel
1 image/sec

Fast transients

Slow transients

Slide from JM Griessmeier
Beamlets:
2 x 5 Gb/s
ARTEMIS-like backend
- Channelization
- pulsar dedispersion
- S-burst detection
- RFI mitigation ...

Subbands:
# of MR x 2.5 Gb/s
NenuFAR-1: 75 Gb/s
NenuFAR: 480 Gb/s
FPGA or GPU based correlator?
-> Spectro-polar-imaging
16x16-pixel skymap
~1s dump time
Transient search, Dark Ages, ...

- Obviously, the two modes are potentially there for the two kind of transients.
  - Is it really included in the design/cost definition? Transient buffer board?
  - Fast transients (see Ismael’s talk). Probably the most interesting targets with higher impact
  - Slow transients: capabilities to do fast imaging? But we will likely be quite limited due to self-absorption
- Fast triggering possible?
- Multi-stations triggering: Chilbolton? removing false alert.
slow transients
Prospect for FRB

How does NenuFAR compare to these facility?

According to H13, in some cases, imaging survey more efficient than beamformed surveys.

Hassall et al. 2013
CONCLUSIONS

- Good perspective, probably more on the fast transients side.
- Need to properly design/choose the back-end capabilities. Important to have these discussions now.
- Computing capabilities needed for fast transients?
- «Not to Slow» transients or «slow fast» transient, capabilities for fast repointing: e.g. prompt emission from GRBs? VO alert from GW.