TRANSIENTS WITH NENUFAR

Few inputs for the discussion

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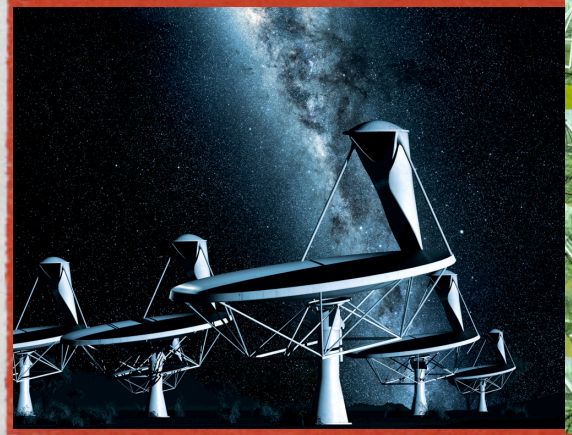
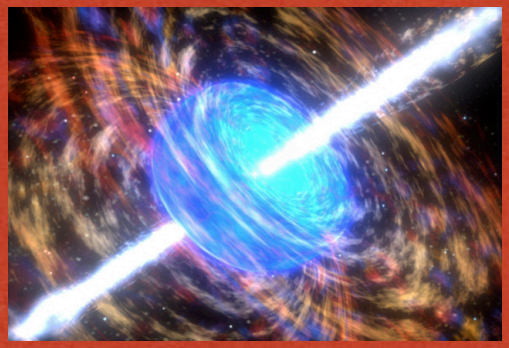
14/2/2014



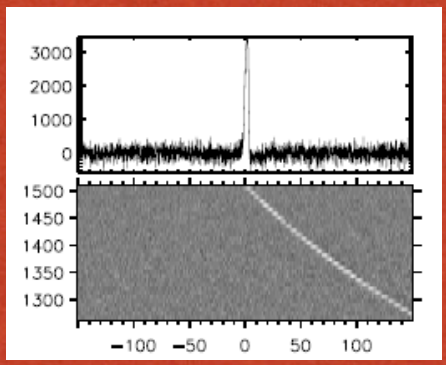
TWO FLAVOURS OF TRANSIENTS

- **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



See SKA-LOFAR radio days for more details



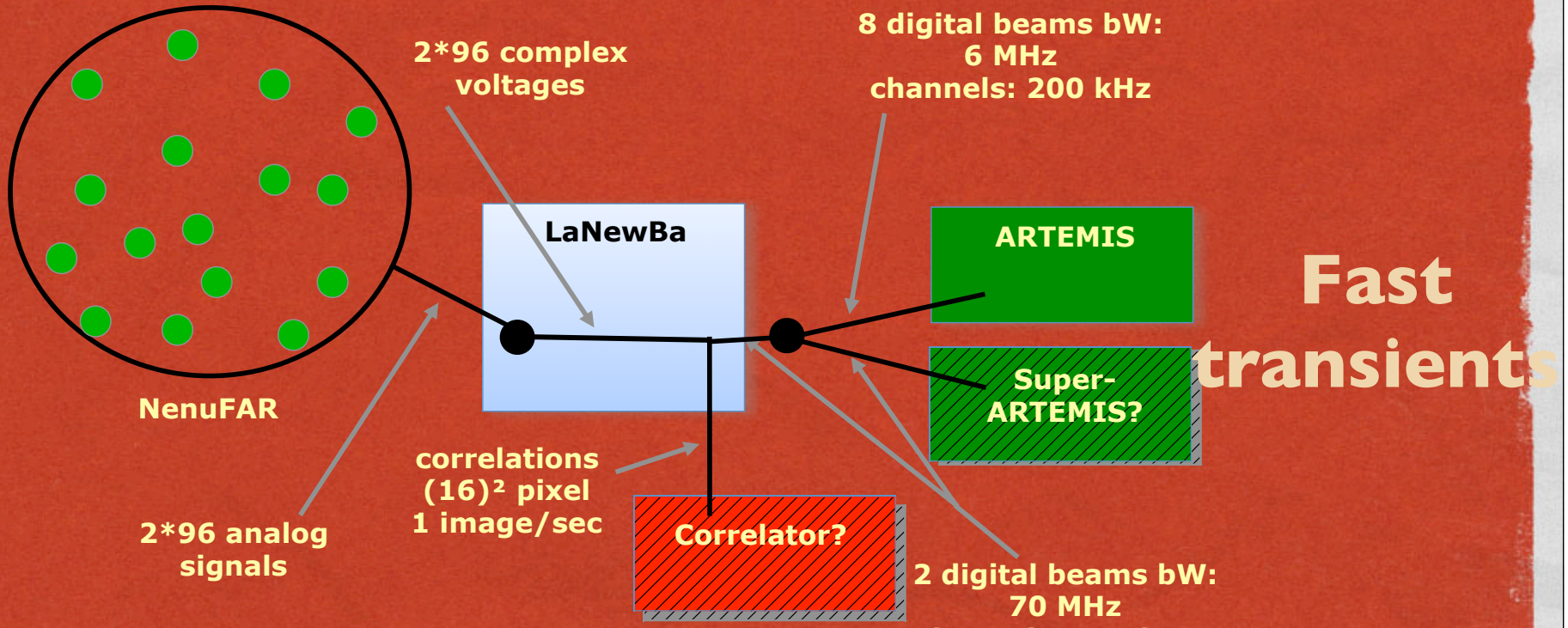
Detection: images

Detection: time series

Expertise/Interests: Saclay, OCA?

LPC2E, OP, Saclay?, ??

LANEWBA: A NEW DEDICATED BACKEND



Fast transients

Slide from JM Griessmeier

Slow transients

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

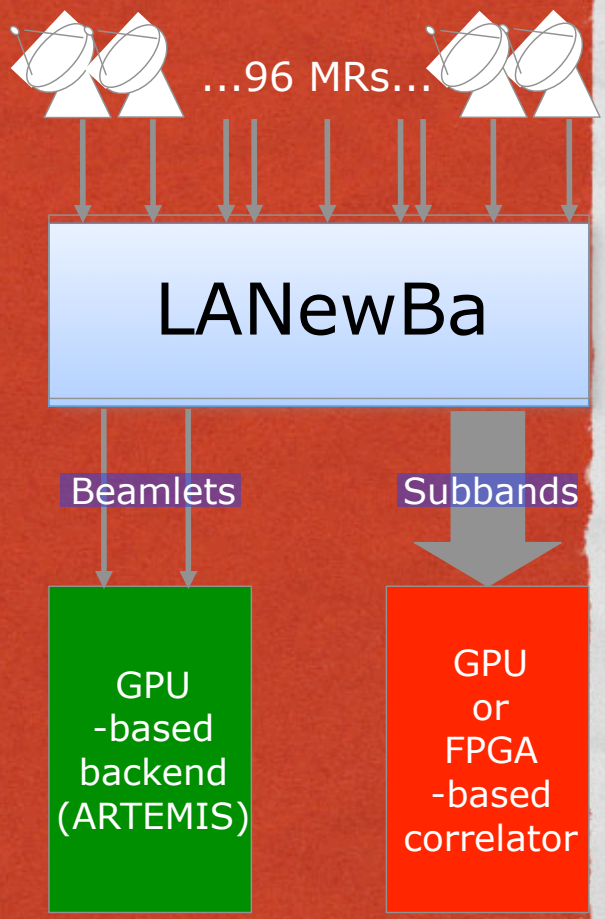
FPGA or GPU based correlator?

-> Spectro-polar-imaging

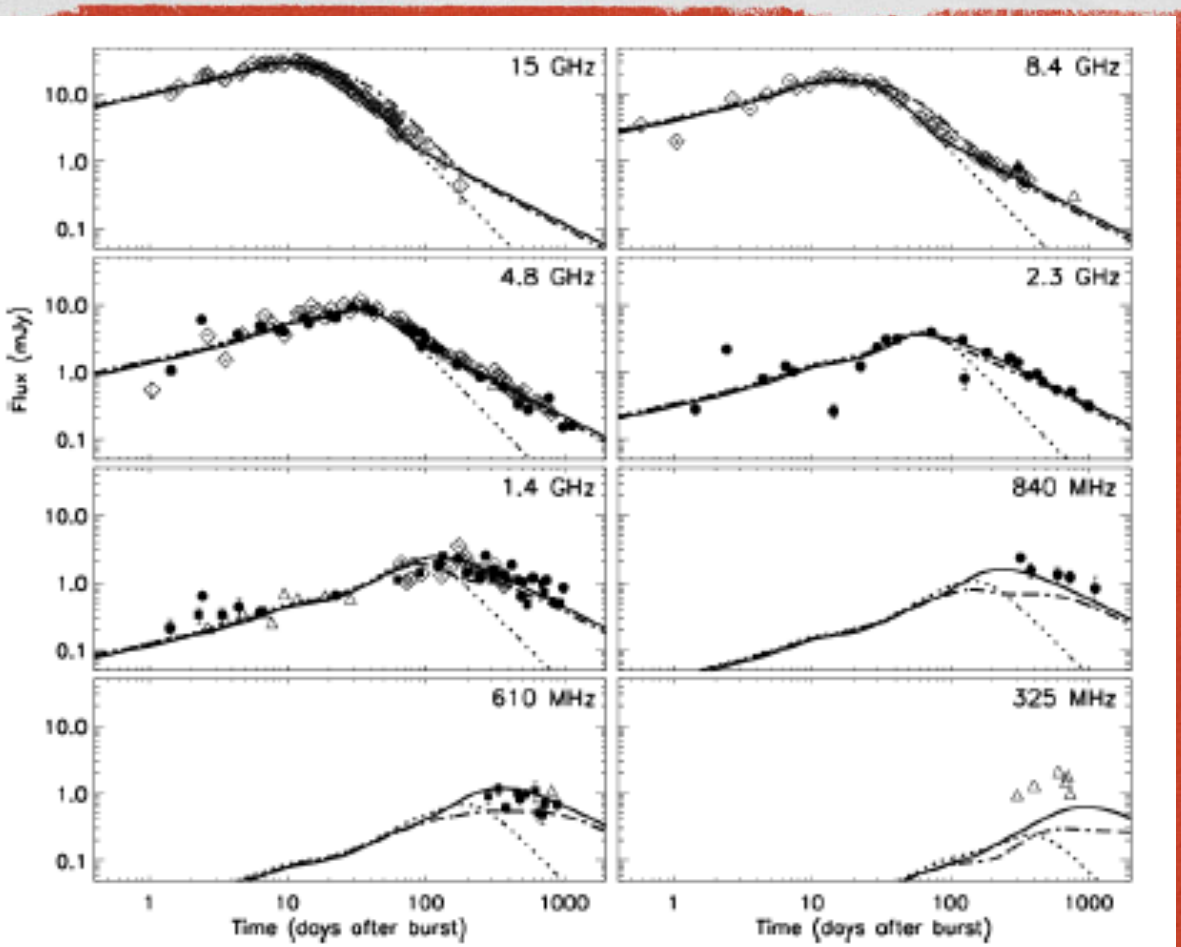
16x16-pixel skymap

~1s dump time

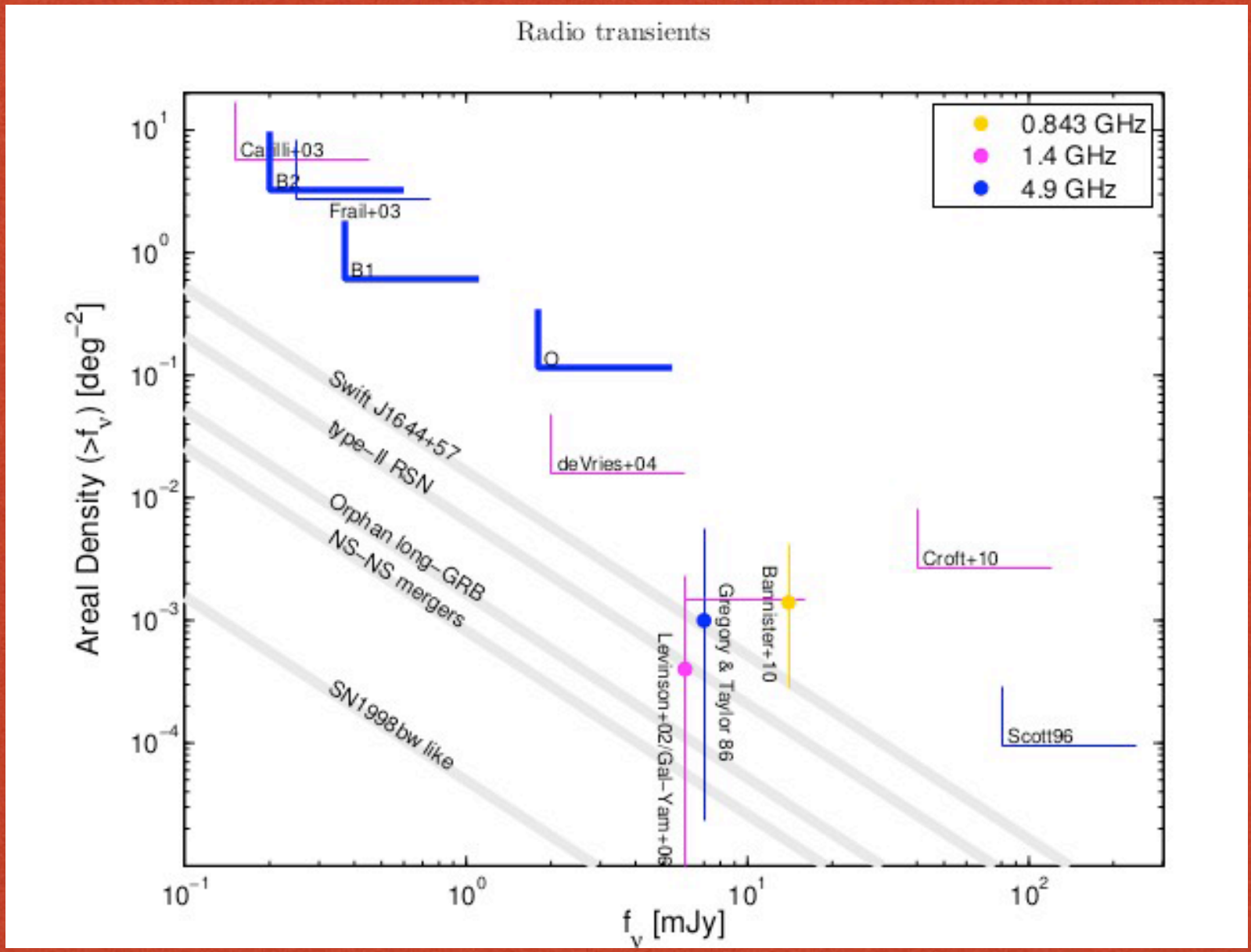
Transient search, Dark Ages, …



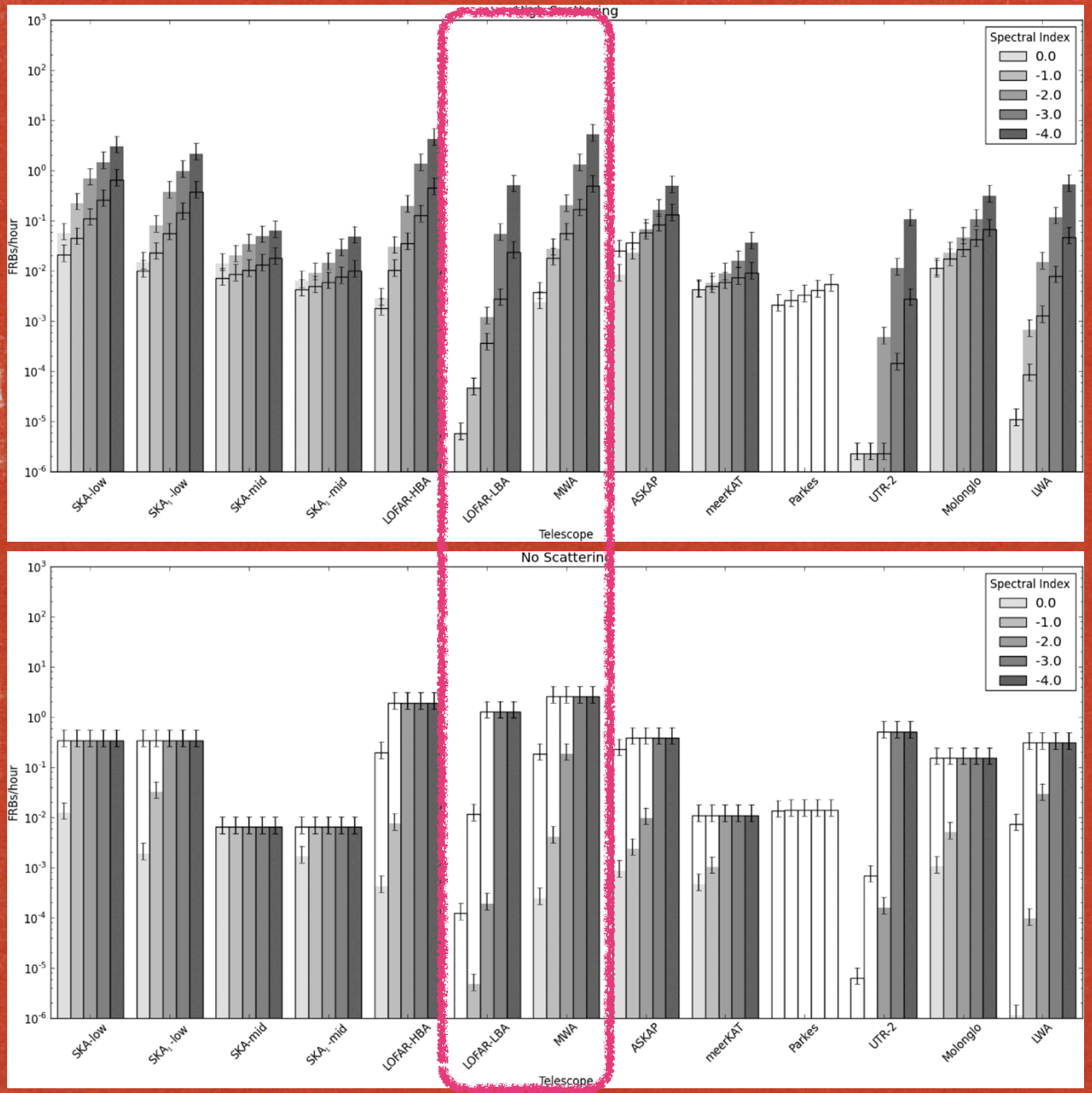
- Obviously, the two modes are potentially there for the two kind of transients.
  - Is it really included in the design/cost definition ? Transient buffer board ?
  - Fast transients (see Ismael's talk). Probably the most interesting targets with higher impact
  - Slow transients: capabilities to do 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.