UNIVERSITY OF AMSTERDAM

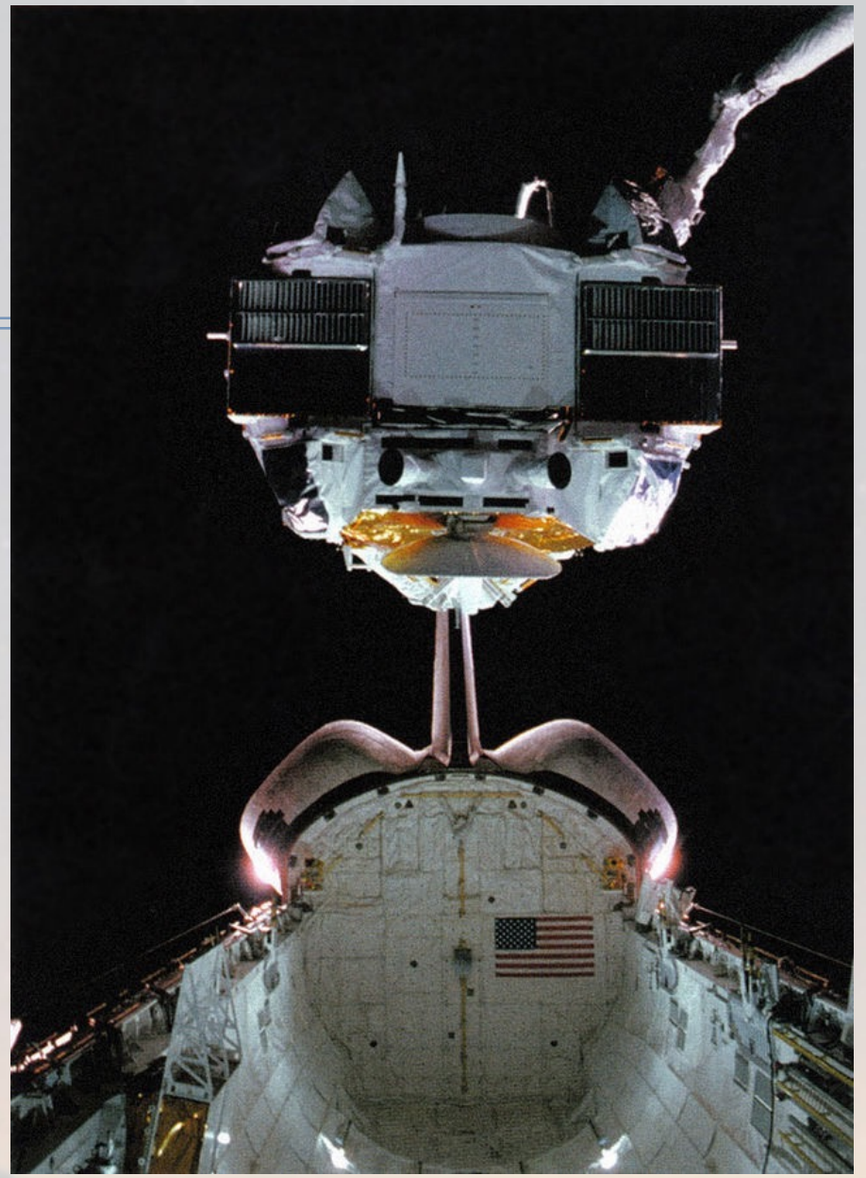
ANTON PANNEKOEK INSTITUTE

# Transients, transients
## A steady hand in a field of change

Ralph Wijers, University of Amsterdam

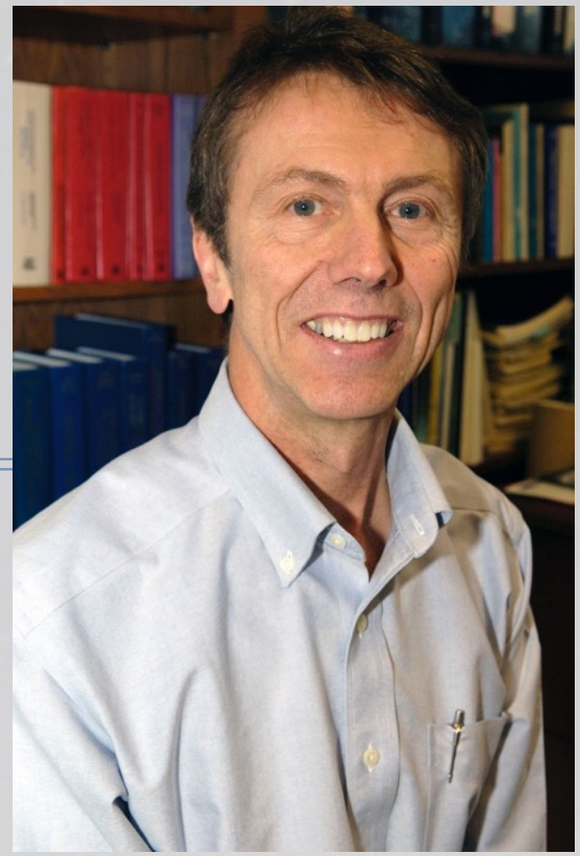
*22 May 2018, National Academy of Sciences, Washington DC*

# Getting to know Neil



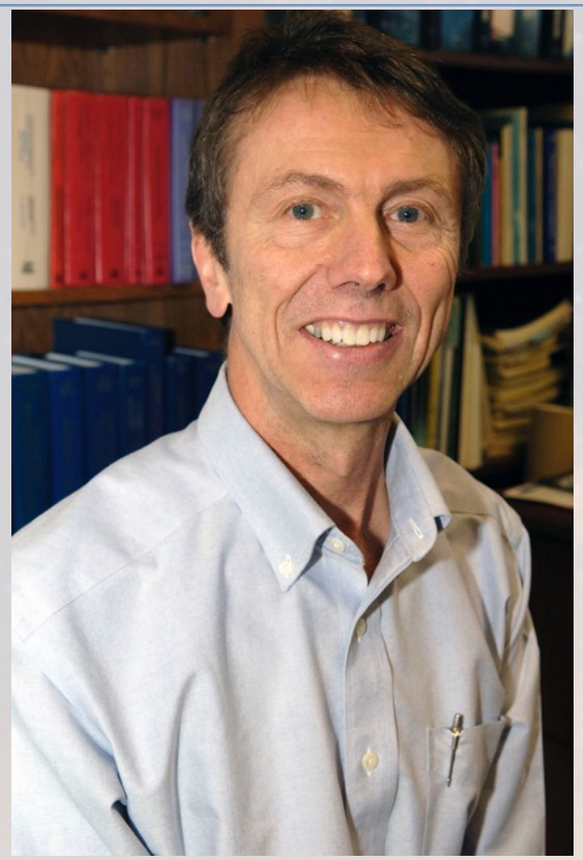
- First-gen Compton Fellow in 1991, same year as Neil became CGRO project scientist, for me with no prior gamma-ray experience
- We first met at 1992 Compton Observatory Symposium

# Knowing Neil



- The world of transients is impatient
- Neil had the cool head to channel our bundles of impatient energy into productive stuff
- He had the knack of making me feel at ease, and feel like an old friend, very quickly
- I feel fortunate to have been so welcomed in the gamma-ray community as an outsider, and quickly became part of it, a ‘well-funded fishing expedition’. Neil embodied that spirit

# Transients, people, mentors



Neil 1952-2017

Bohdan 1940-2007

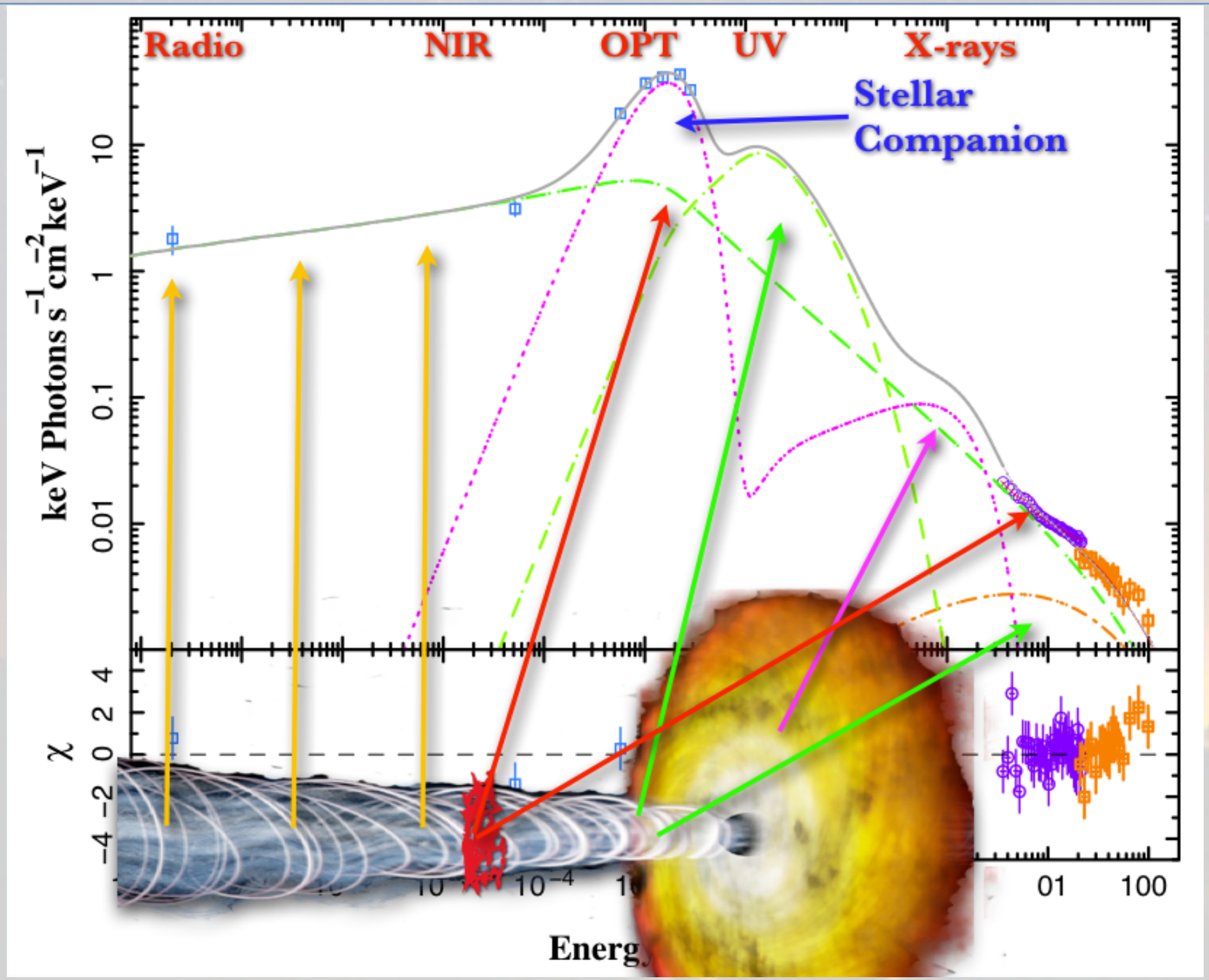
Jan 1946-1999

- A transient is simply a temporary thing that surprises us with something before it disappears again

# Well-funded fishing expedition 2: From GeV to neV photons

- X- and gamma-ray sky *are* transient - not having transient discovery machines there would be irresponsible.
- Need to allow for serendipity: all-sky, many timescales, many wavelengths and messengers
- XRBs, GRBs, SGRs, TeV blazars, FXTs, ….
- You mostly probe sources of particle acceleration, non-thermal stuff. Natural partner is radio, which probes the same. How about transient monitoring there?
- PSRs, RRATs, FRBs, “GC burper”, “LOFAR NCP source”, ….

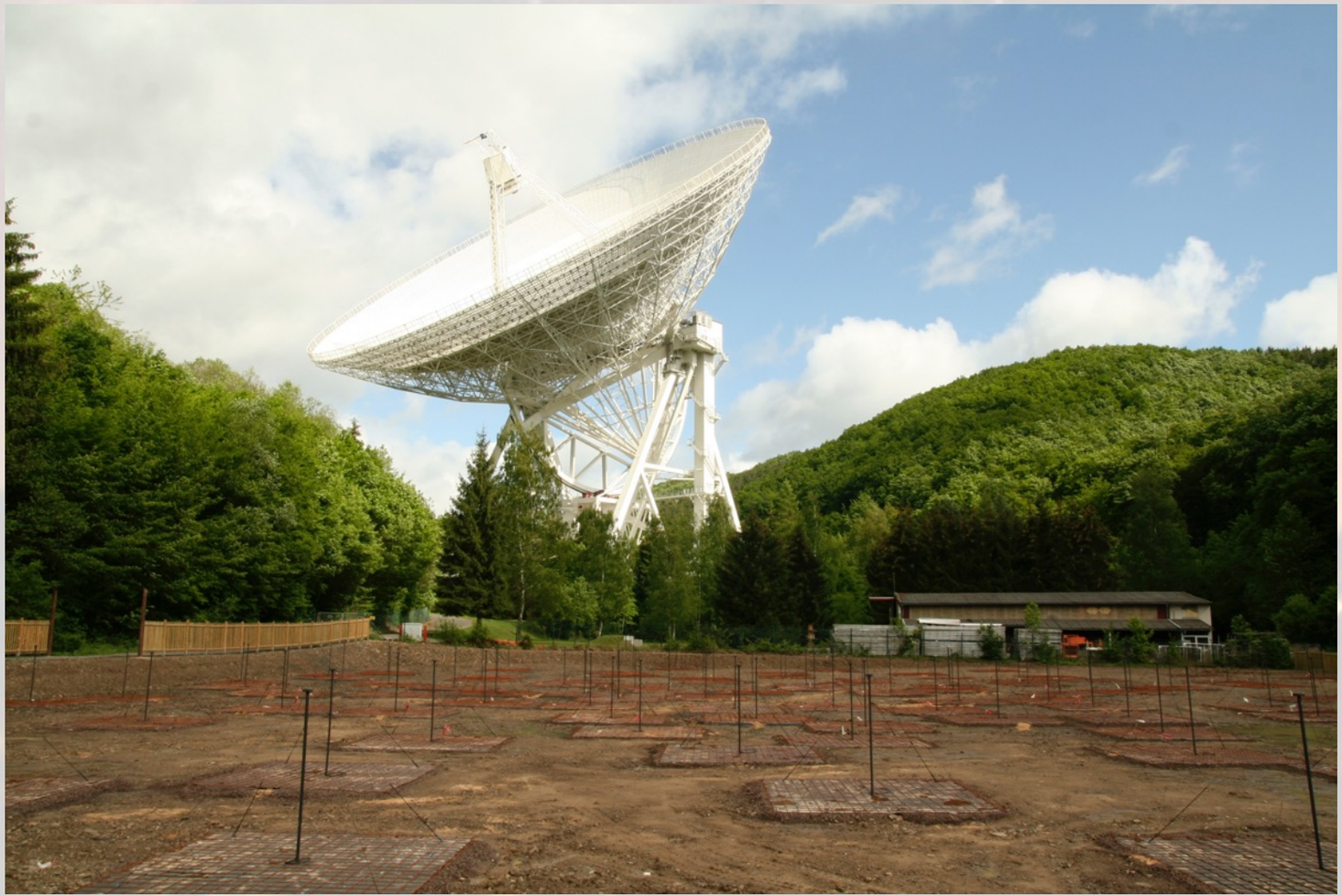
# Well-funded fishing expedition 2



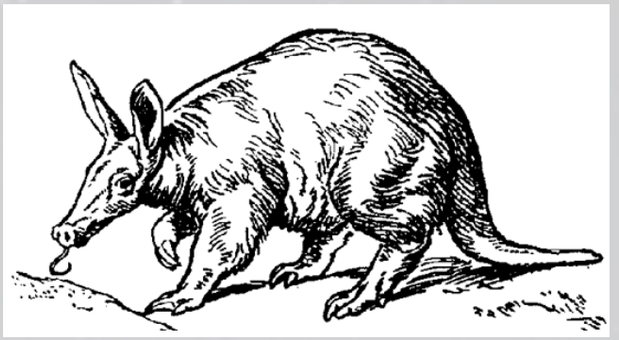

Sera Markoff c.s.

# Radio all-sky monitoring

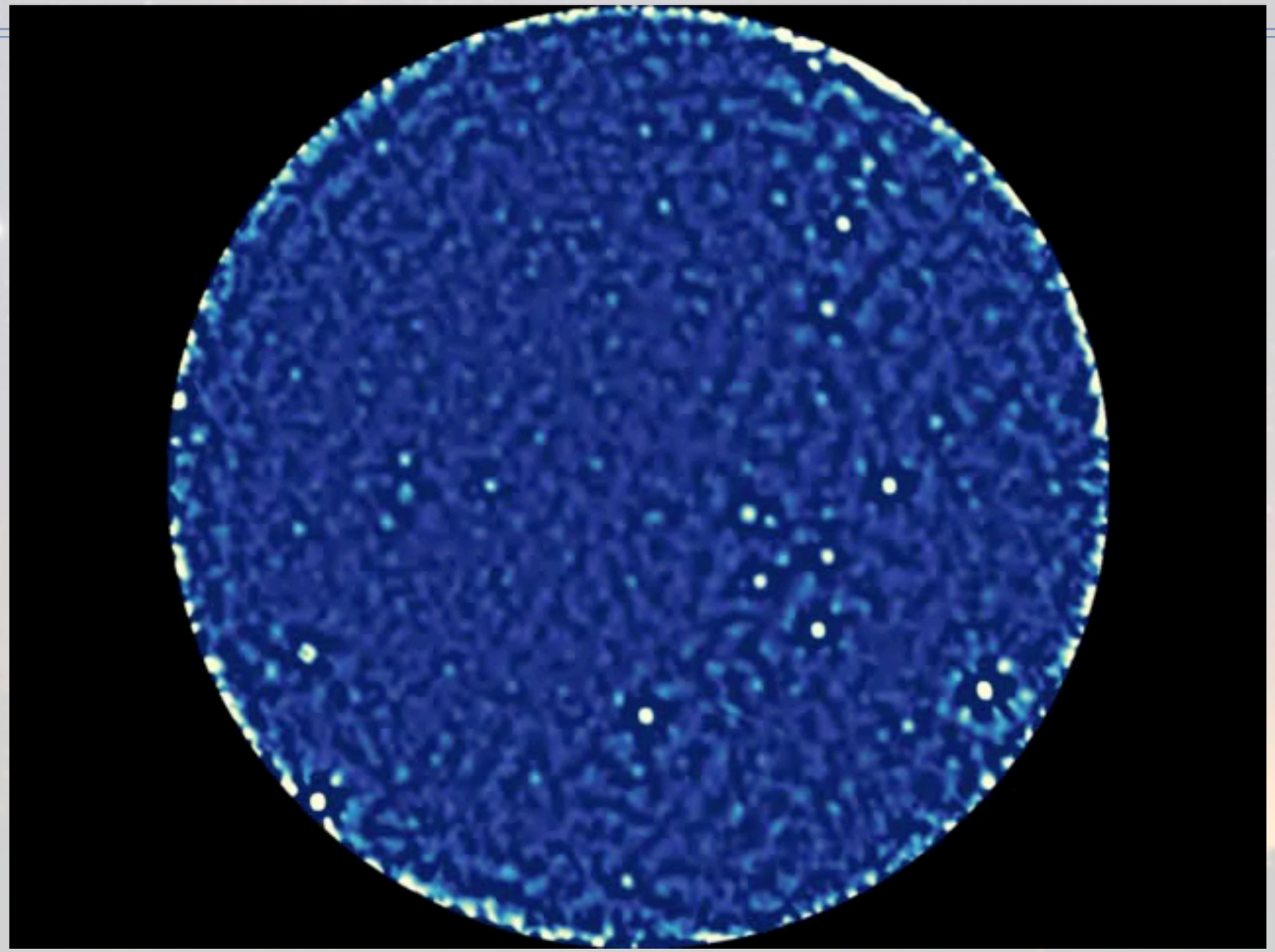
- X- and gamma-ray has been wide-field from the start (narrow field hard!)
- Radio has been narrow-field from the start, wide-field much harder
- BUT: dipole arrays
- (plus HPC!)
- LOFAR, SKA-low
- wide-field (2-20$^{o}$)



# AARTFAAC: all-sky

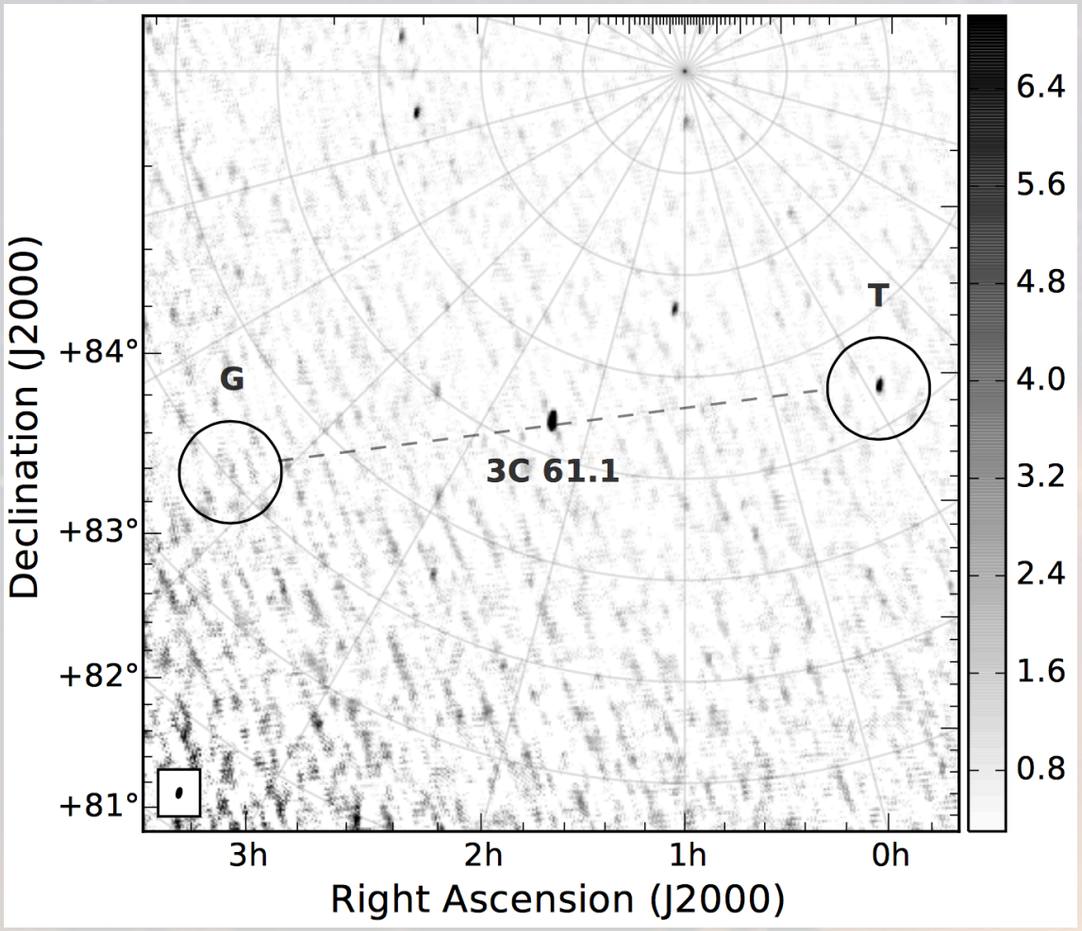


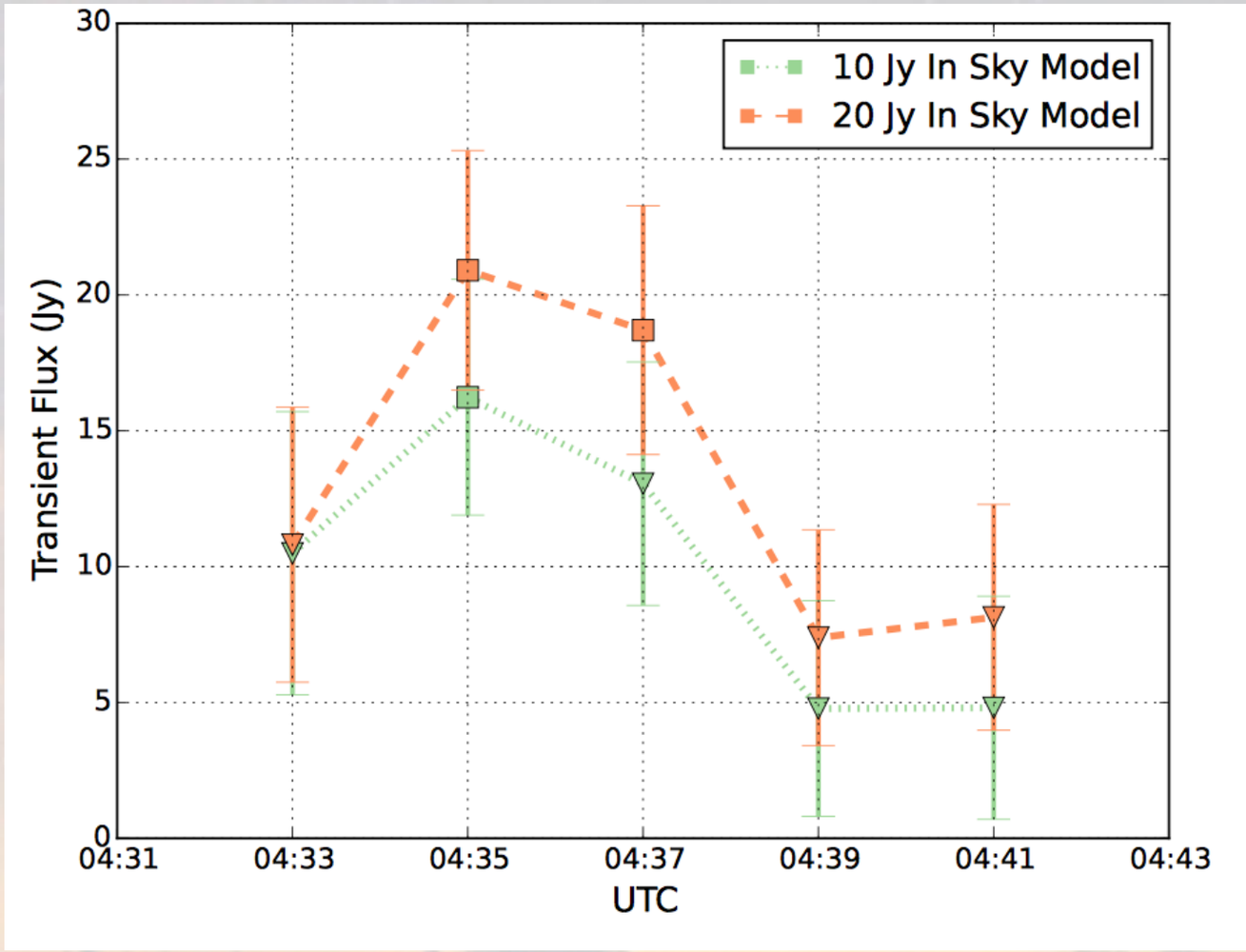
AARTFAAC



- Resolution ~0.5 deg and 1 sec, sensitivity ~Jy, frequency 30-80 MHz

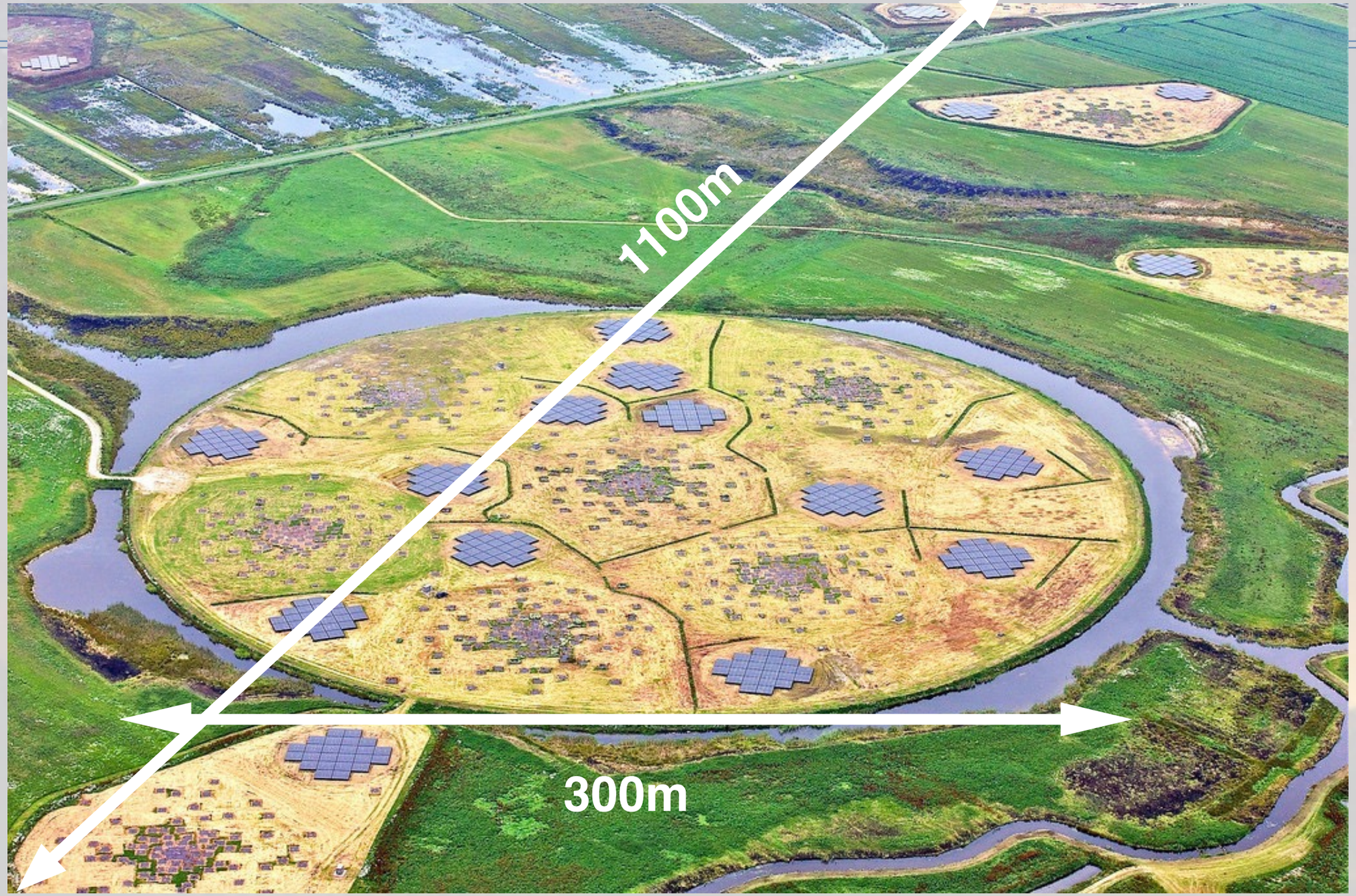
# A strange LOFAR transient



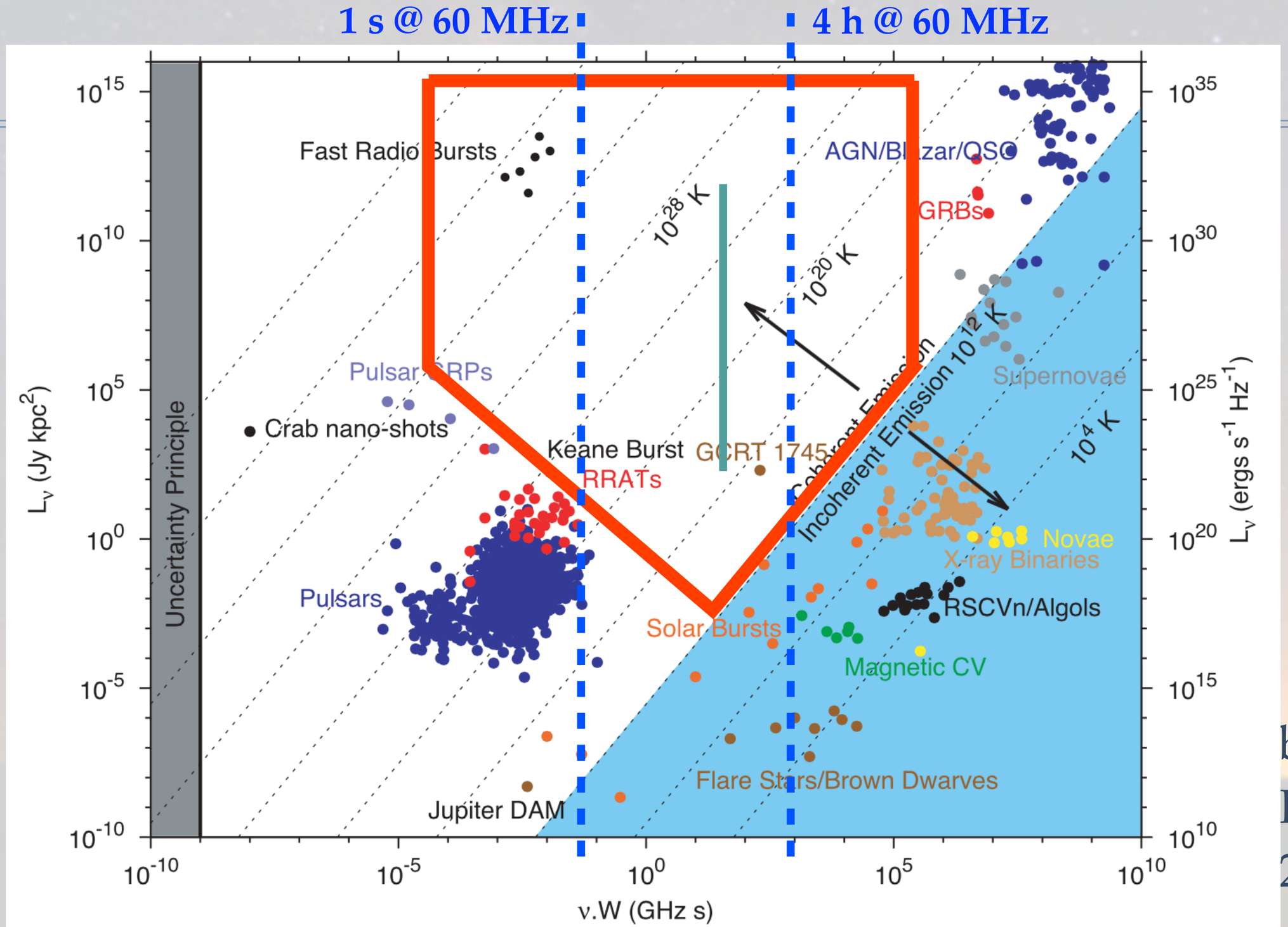




15-20 Jy flare lasting ~5min at 60 MHz (Stewart et al. 2016)

# AARTFAAC layout



# “Physics forbids it” - NO!




based on Pietka et al. 2015

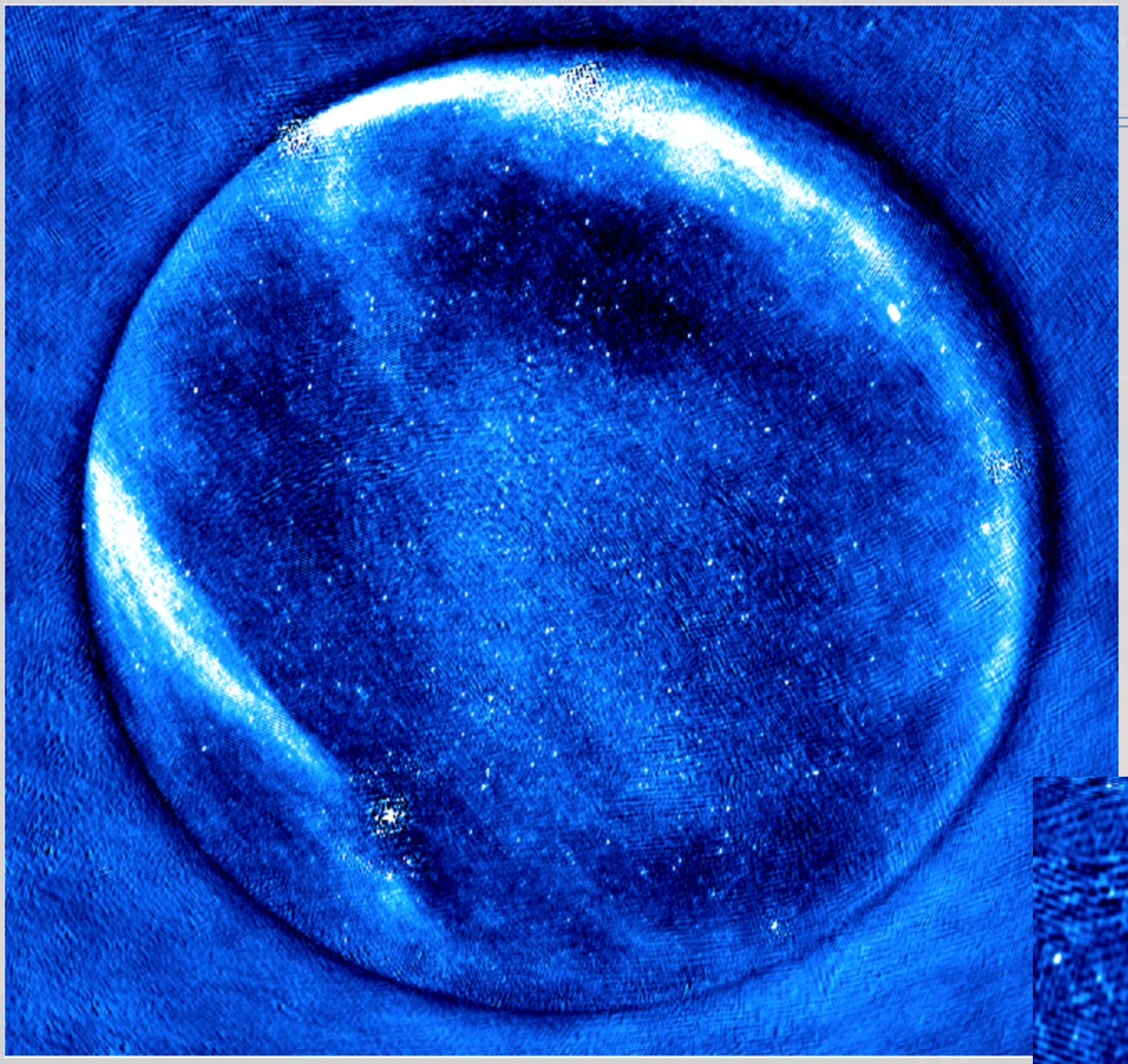
- Only incoherent radiation is blackbody-limited!

# Where next?

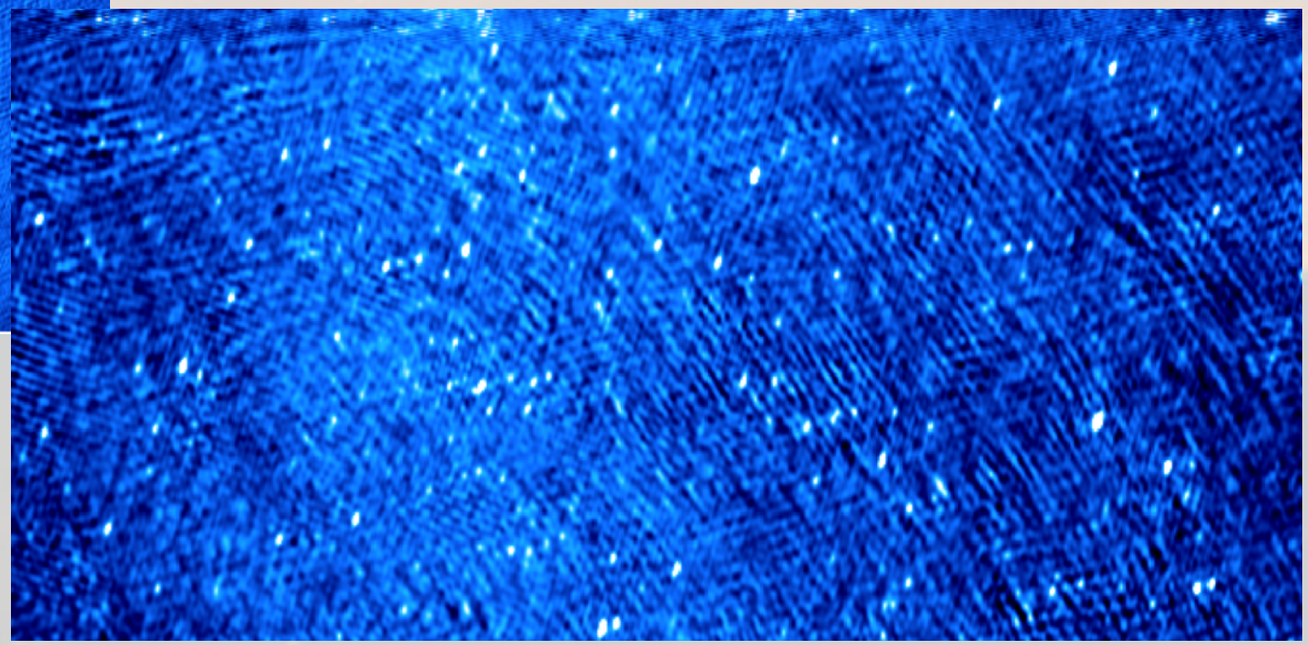
- Fast, automated triggering across many observatories (e.g., VOEvent)
- E.g., LOFAR responsive telescope
- Time-slicing large surveys
- Co-observing with dedicated monitor telescopes, e.g., MeerLICHT, BlackGEM
- From 6-station to 12-station, 2x collecting area, 3x resolution

Antonia Rowlinson

# AARTFAAC-12 preview



- 15min
- 0.2 MHz bandwidth
- 11/12 stations



# Take-home message(s)

- Transient monitoring and followup will break a lot of new ground, new astrophysics, in the coming years. Multi-messenger!
- We need to keep good transient monitors up in space
- We need to allow for serendipity, quirkiness, chance; i.e., not to rigorously planned programmes
- Cut unusual ideas and/or young people some slack
- Neil was good at that