

*‘Quiquid differat notandum’*

# *The Transients KP*

Ralph Wijers,  
On behalf of the TKP

# *Topics TBD*

- ⊕ Meat of science in later talks
- ⊕ Organisation of TKP
- ⊕ Global goals and strategy
- ⊕ An invitation

# *Bohdan Paczyński*

## 1940-2007



High-energy, versatile  
astrophysicist

Surveyor of the  
universe

# *Key Projects?*

- ⊕ 'Large observing projects that have driven (or will drive) the design and specification of LOFAR'
- ⊕ Now: EoR, SRV, TRA, CR
- ⊕ TRA: fast response, high-rate real-time data processing, flexible configuration, dedispersion, tied-array, RSM mode

# Organisation and People

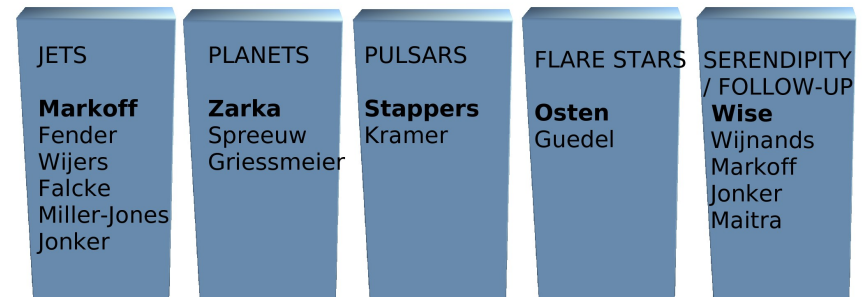
## LOFAR TKP PIs

Rob Fender (So'ton / UvA)  
Ralph Wijers (UvA)  
Ben Stappers (ASTRON / UvA)

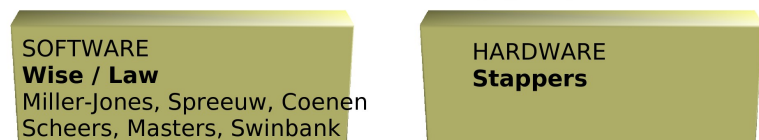
## Full members

Sera Markoff (UvA)	Rudy Wijnands (UvA)
Heino Falcke (ASTRON)	Philippe Zarka (Paris)
Rachel Osten (UMD)	James Miller-Jones (UvA)
Casey Law (UvA)	Hanno Spreeuw (UvA)
Bart Scheers (UvA)	Michiel van Haarlem (ASTRON)
Michael Wise (UvA)	Dipankar Maitra (UvA)
Joe Masters (UvA)	John Swinbank (UvA)

## Science working groups



## Technical working groups



# *Goals*

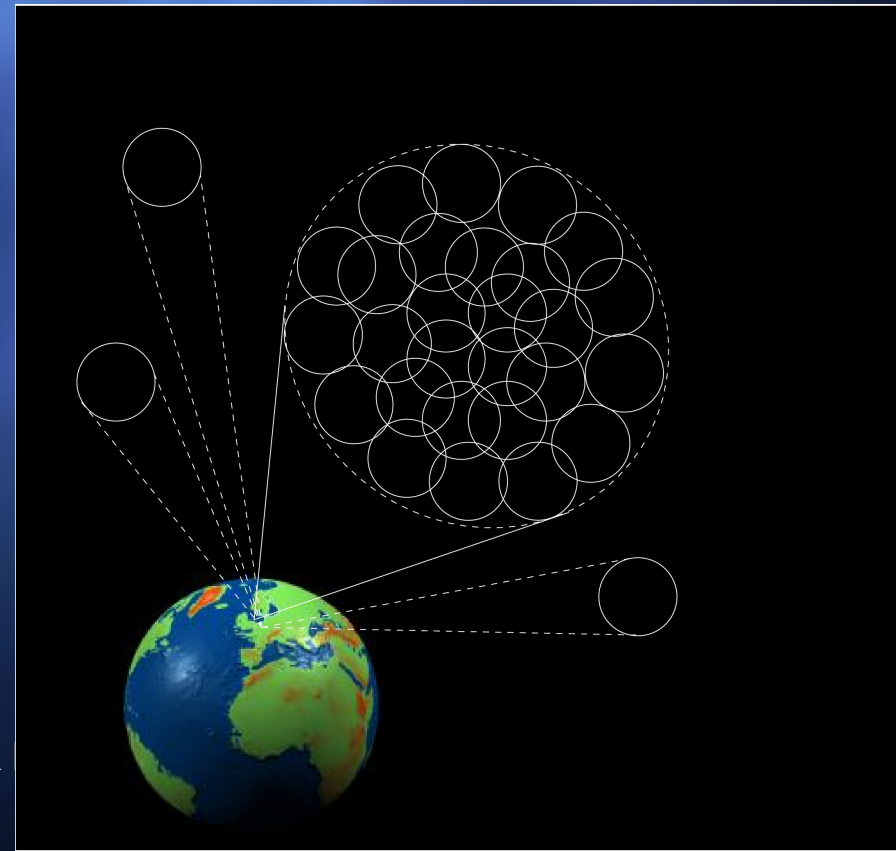
- ⊕ Trawl the sky for known and unknown types of variable source, produce triggers and light curves [public!]
- ⊕ Improve our understanding of many extreme astrophysical sources: pulsars, black holes, GRBs, exoplanets, flare stars, ...

# *Some expectations*

<b>Class of object</b>	<b>Time-scale</b>	<b>Expected / year</b>	<b>Maximum Distance</b>
GRB afterglows + X-ray binaries	minutes-months	~100	Observable universe
LIGO Events / pulsar flares	msec / hours	0-10	Observable universe
Radio Supernovae	days / months	~ 5	100 Mpc
Intermediate mass BH	days	1-5	30 Mpc
Flare Stars	msec / hours	100-1000	1 kpc
Exo-planets	min / hours	10-100	30 pc

# *Use Case 1: RSM*

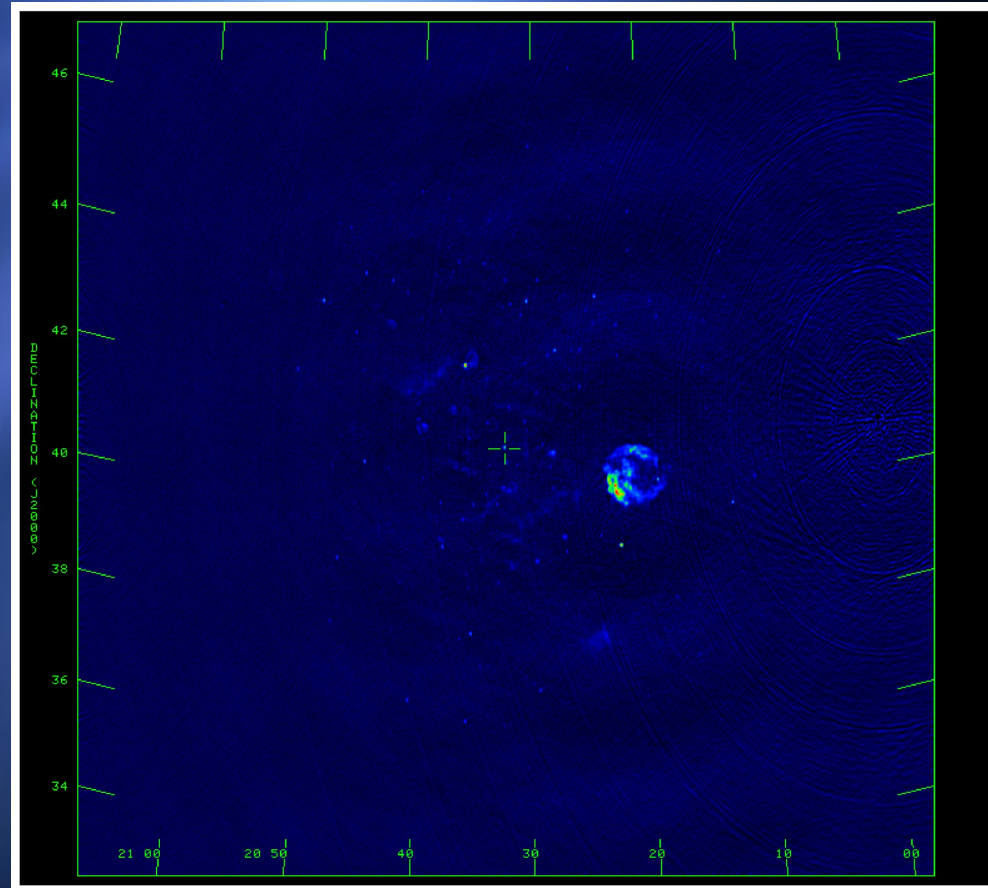
- ⊕ 'All-sky all the time'
- ⊕ Down to 1 sec
- ⊕ 30+120MHz,  
11+1.4mJy / 320s  
(32MHz bandw.)
- ⊕ CS-1 test: poster  
C. Law





# *Use case 2: Target [class]*

- ⊕ Targeted observations of known sources
- ⊕ E.g. XRBs, Exoplanets, GRB/SN
- ⊕ Full-array mode!



James Miller-Jones

## *Use case 3: 'Piggybacking'*

- ⊕ Full-array map has similar number of pixels as core map, so why not analyse that data stream too?
- ⊕ Con: no control over settings, inhomogeneous
- ⊕ Pro: increased discovery space with same data

## *Use case 4: Pulsars*

- ⊕ With core, in tied-array mode, dedispersed
- ⊕ Surveys: 1000-2000 new
- ⊕ Followup: timing, emission physics, ISM studies, ...

# *Transients Pipeline*

- ⊕ Aim: analyse variability in input on timescales of 1, 2, 5, 10, ... Sec, dedispersed, in near-real time
- ⊕ Requires:
  - ⊕ Detection
  - ⊕ Recognition
  - ⊕ Action:
    - ⊕ Triggering - alert & followup
    - ⊕ Cataloguing
- ⊕ Posters Law, Coenen

# *Recap*

- ⊕ Catalogue the low-frequency variable radio sky, with trigger alerts
- ⊕ Detailed studies of some classes of object

# *Help available?*

- ⊕ Software pipeline: formidable task
- ⊕ Expertise on radio transients/variables
- ⊕ Resources at other instruments, for triggered & simultaneous observations
  
- ⊕ Come and talk!