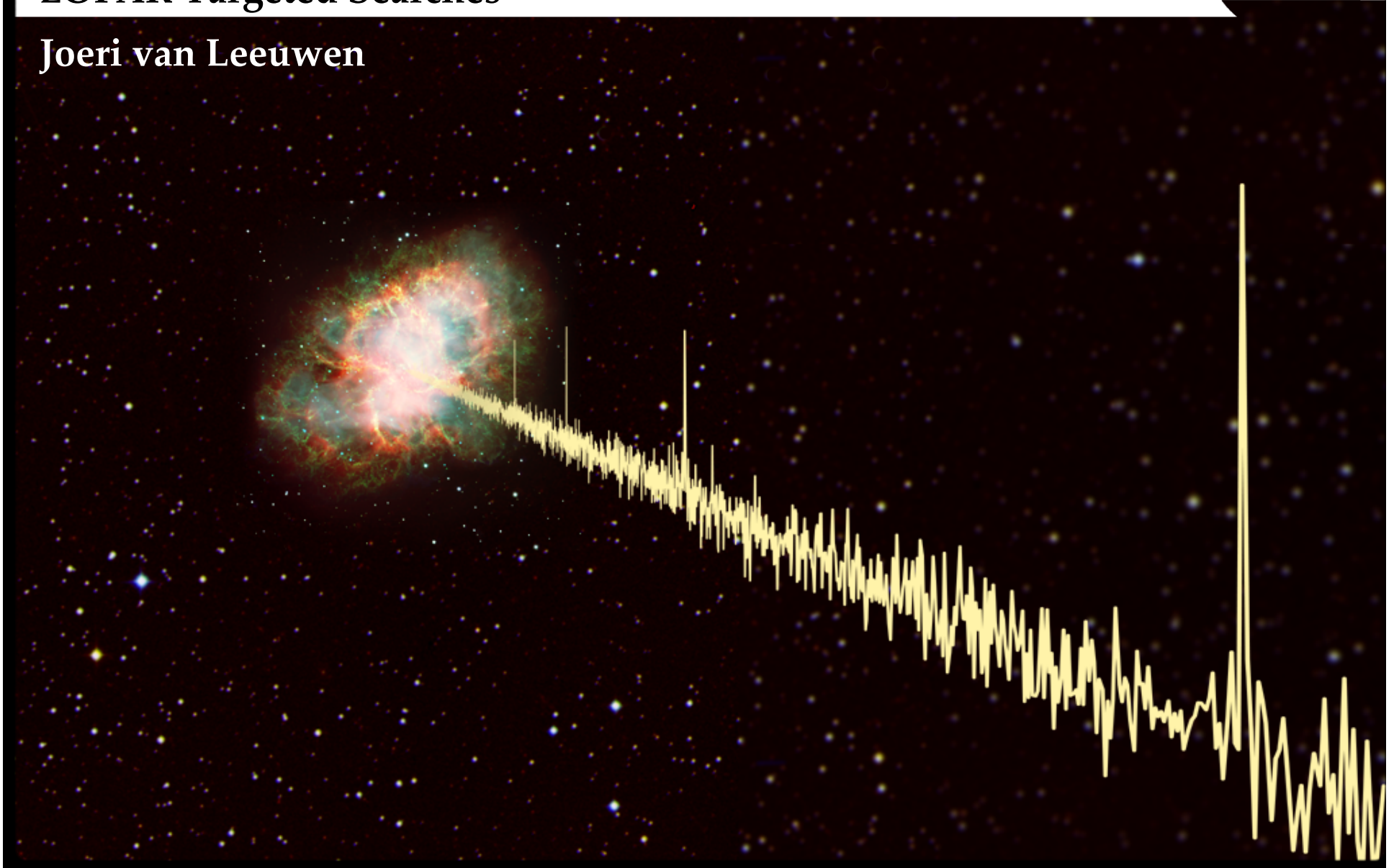


# LOFAR Targeted Searches

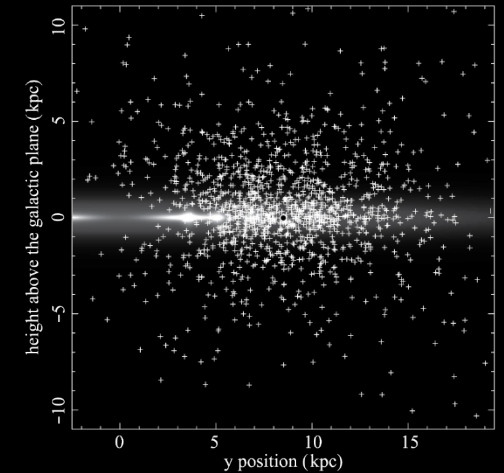
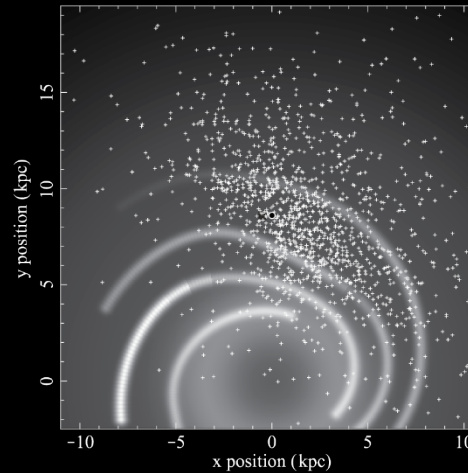
Joeri van Leeuwen



# LOFAR Pulsar Surveys

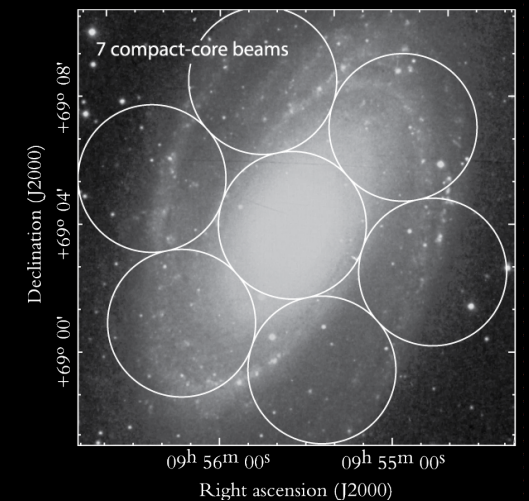
*All sky:*

Large core FoV allows for long integrations even on all-sky (van Leeuwen 2004)



*Targeted:*

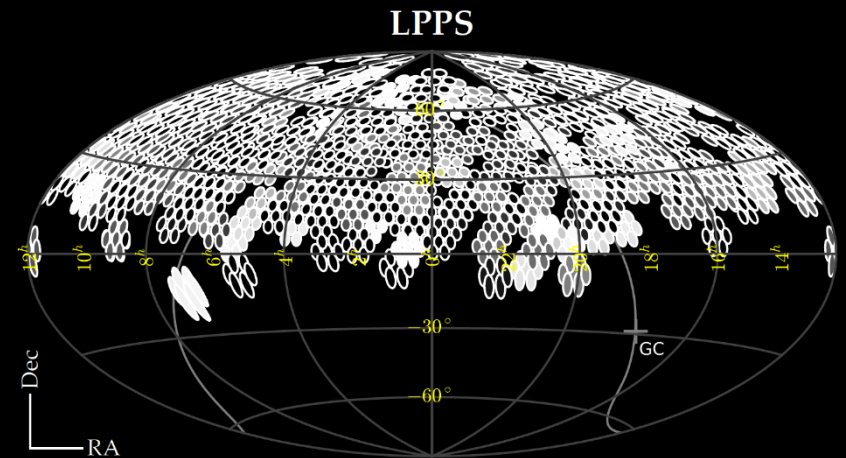
Use larger part of array for increased sensitivity (van Leeuwen & Stappers 2010)



# LOFAR Pulsar Surveys

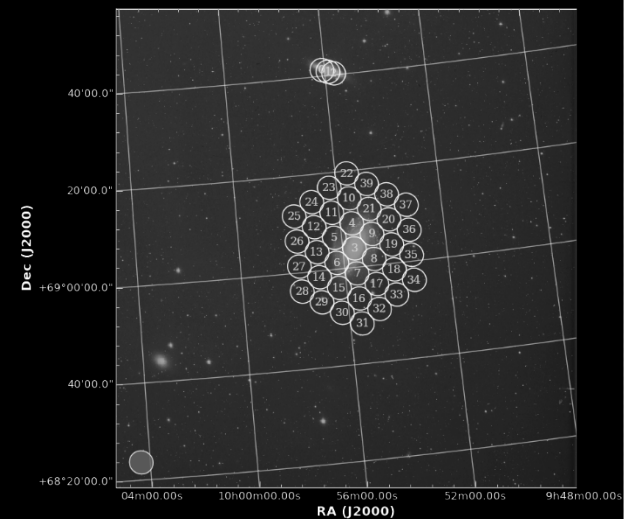
*All sky:*

Best low-freq FRB limit,  
 First pulsar detections  
 (Coenen, van Leeuwen, et al. 2014)  
 -- For update, see Daniele Michilli's talk



*Targeted:*

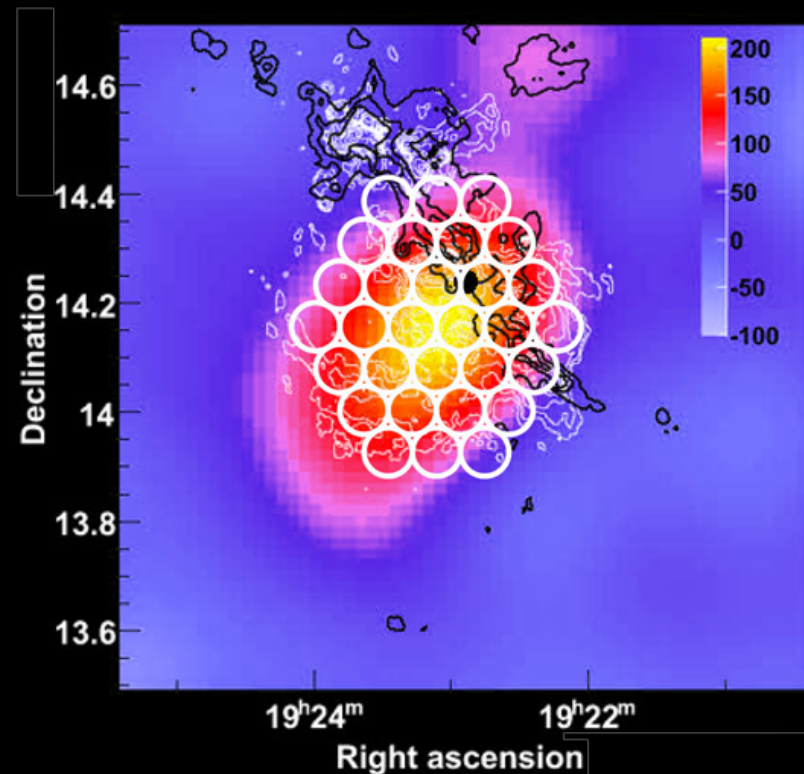
Hosts (SNRs, GCs, Gals) & point sources (radio, X/ $\gamma$ -ray)  
 (e.g. Mikhailov & van Leeuwen 2016)  
 -- This talk



## Hosts – Supernova Remnants

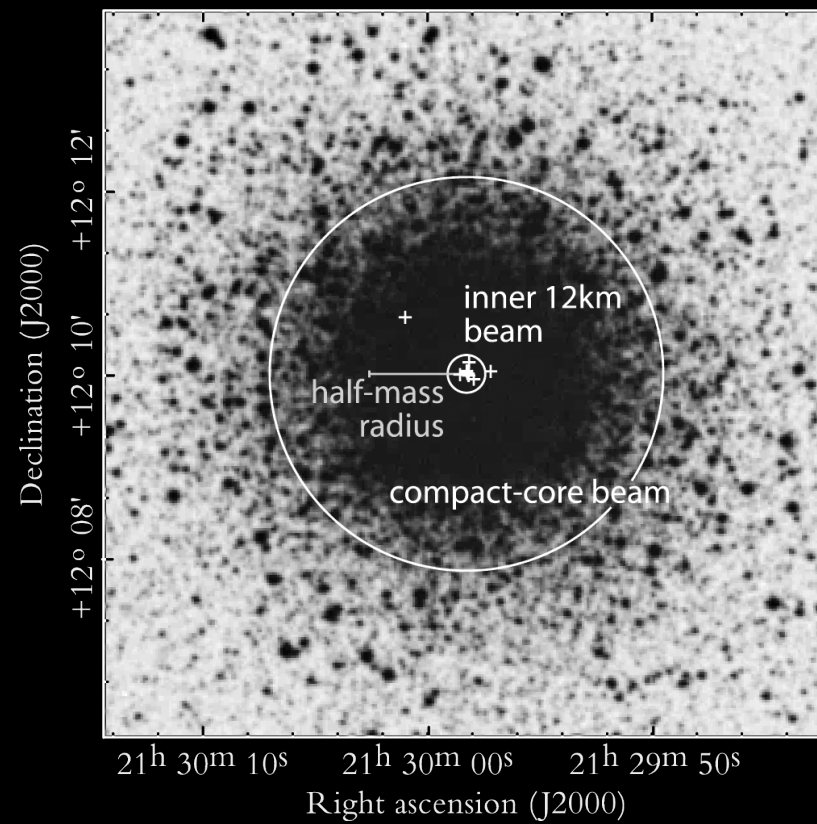
Eight supernova remnants (Straal & van Leeuwen 2016):

W51C, G63.7+1.1,, G065.3+5.7, Cygnus Loop, DA530, G141.2+5.0, G150.3+4.5, IC 443



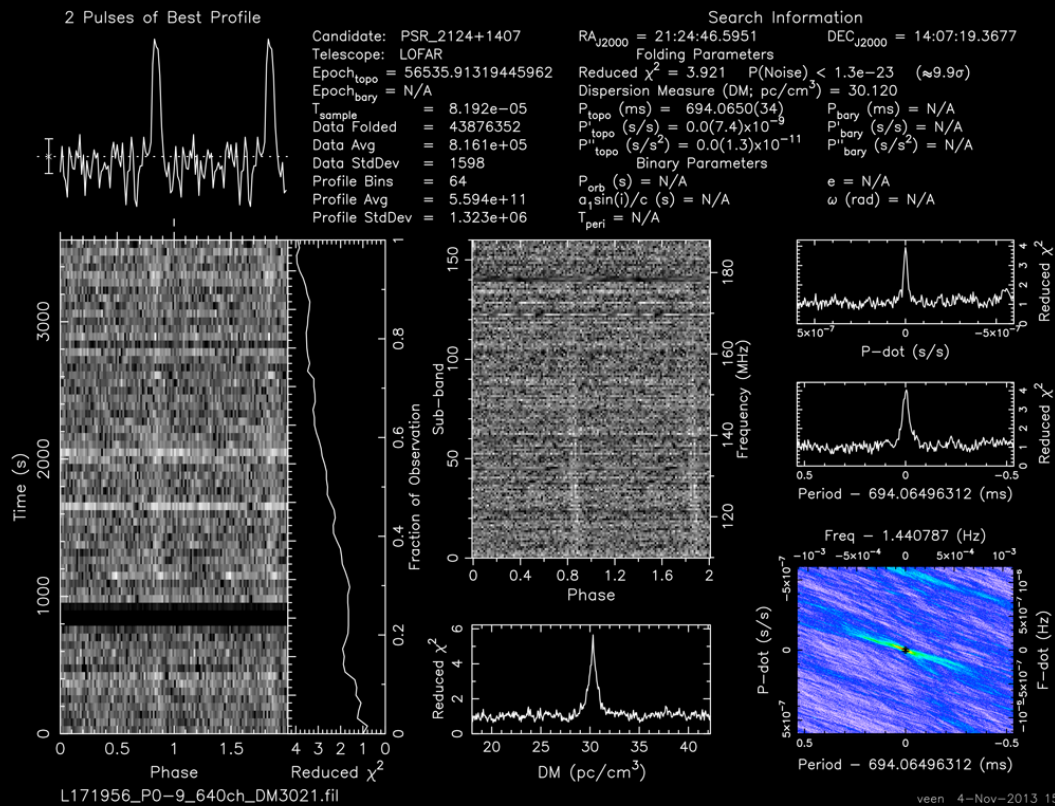
Hosts – Globular Clusters

GC M15 (ter Veen, van Leeuwen, et al. 2015)



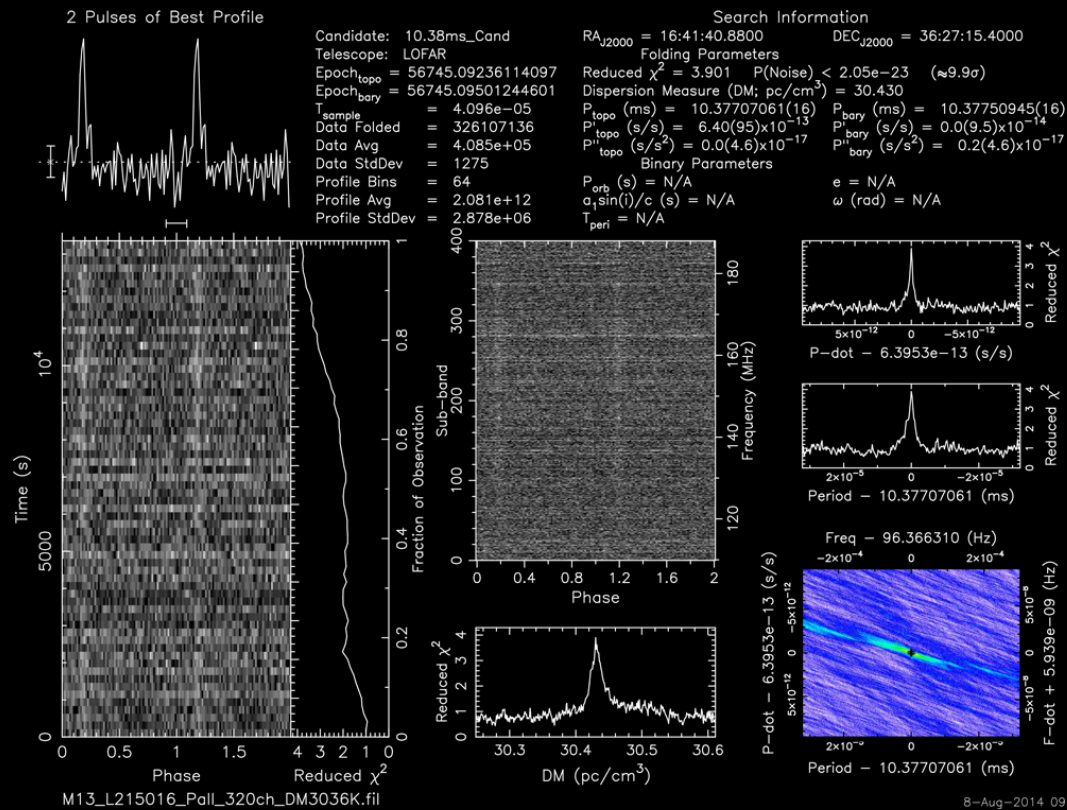
# Hosts – Globular Clusters

GC M15 (ter Veen, van Leeuwen, et al. 2015)  
 Test pulsar detected .. But GC pulsars surprisingly absent



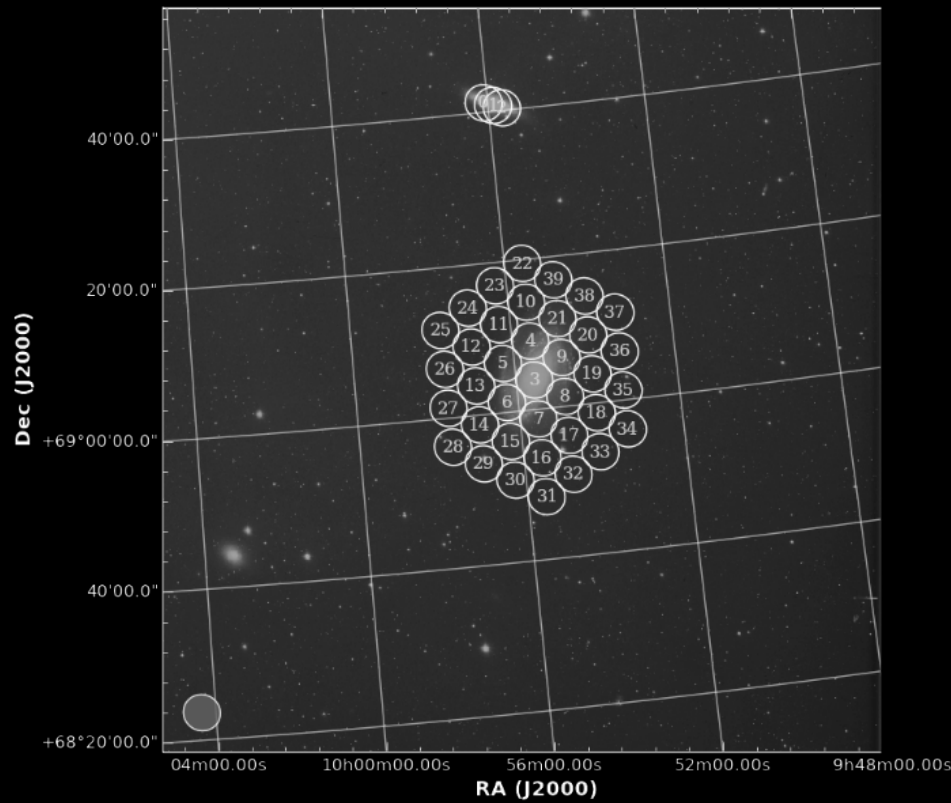
# Hosts – Globular Clusters

GC M13 (ter Veen, van Leeuwen, et al. 2015)  
 M13A detected.. but not other known M13 pulsars. Spectral turn over?



# Hosts – Nearby Galaxies

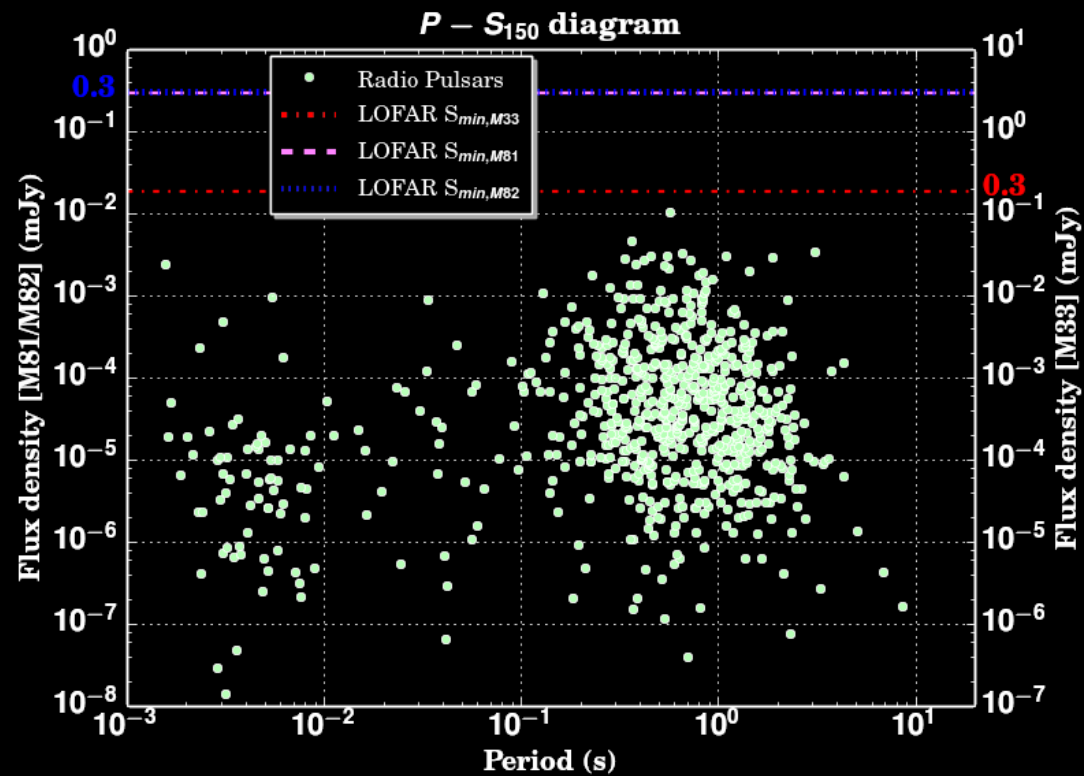
Four nearby galaxies (Keane et al. 2016, Mikhailov & van Leeuwen 2016):  
M31, M33, M81, M82





# Hosts – Nearby Galaxies

Four nearby galaxies (Keane et al. 2016, Mikhailov & van Leeuwen 2016):  
M31, M33, M81, M82



Point sources – Imaging candidates

EOR-field steep spectrum source (Cooper et al. 2016)  
PSR J0815+4611

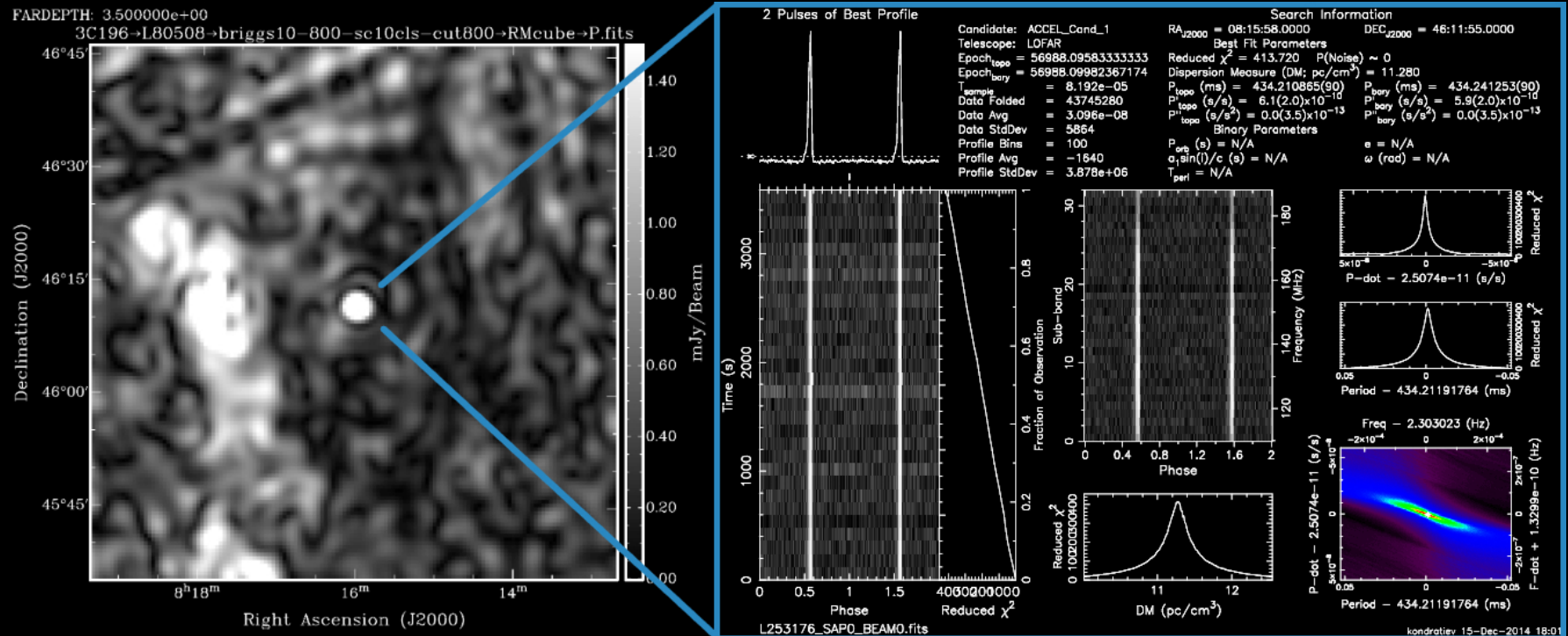
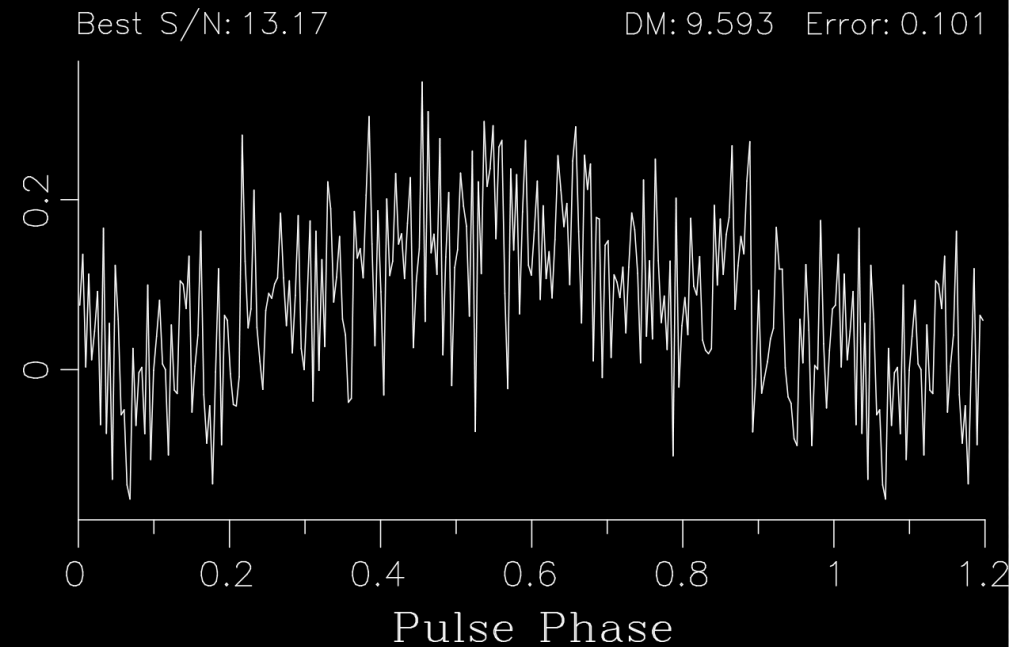
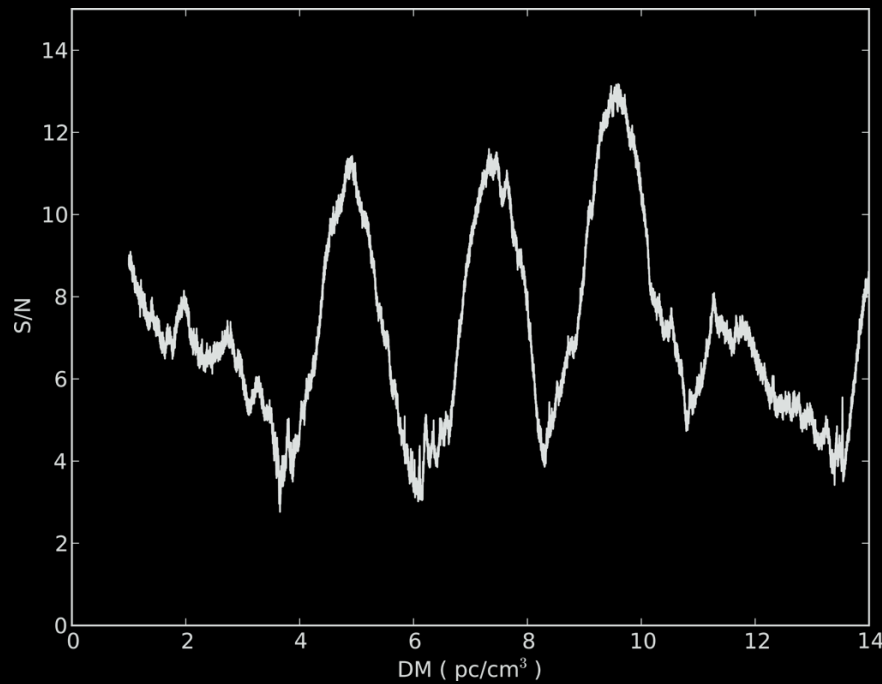


Figure by Vlad Kondratiev

Point sources – High-energy pulsars

Radio-quiet neutron stars (van Leeuwen, Coenen, et al. 2016)

*Geminga: not detected*



Point sources – Fermi unidentified sources

A search in 150 more Fermi Unidentified sources (Pleunis et al. 2016)

Coherent dedispersion search  
 Runs on DRAGNET cluster  
 -- see Sotiris Sanidas' poster

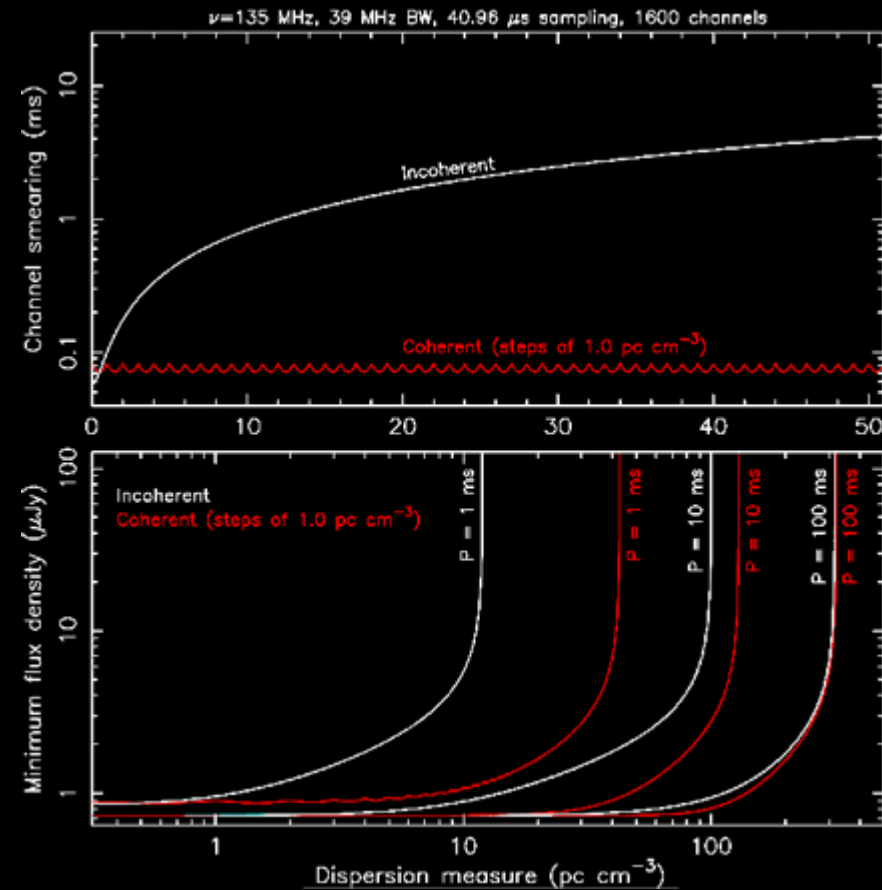


Figure by Cees Bassa

## Conclusions

First LOFAR targeted-search pulsar found, based on steep spectrum imaging source.

Other programs have put first upper limits on the low-frequency pulsed emission in GCs, SNRs, Nearby galaxies and high-energy pulsars.



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