PL612 report on current scientific research
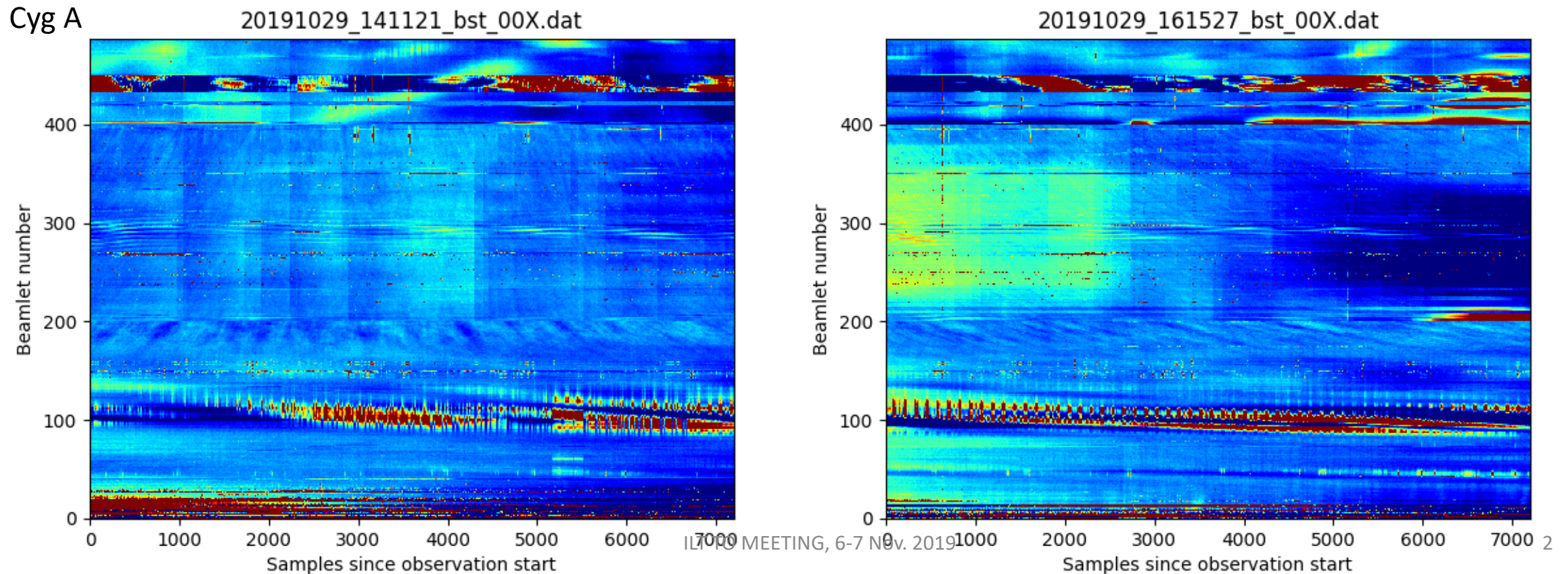
PL612 – Bałdy / Poland

Leszek Błaszkiewicz & PL612 Team

University of Warmia and Mazury in Olsztyn
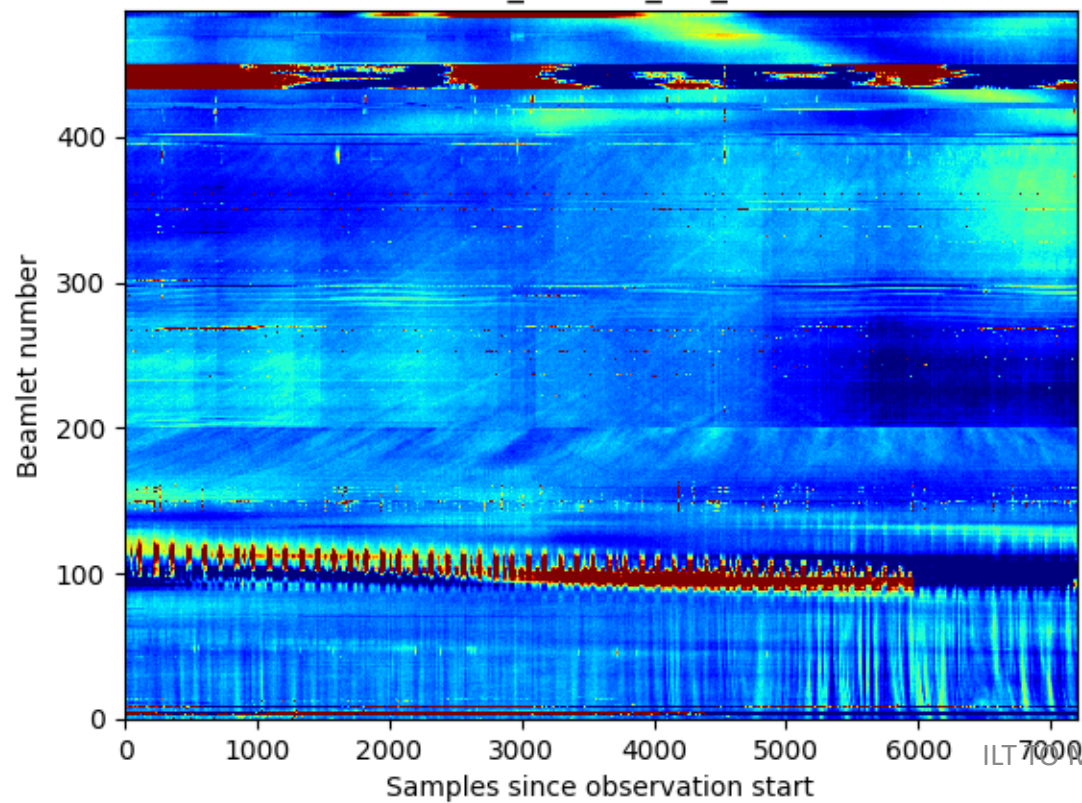
To move smoothly to scientific matter
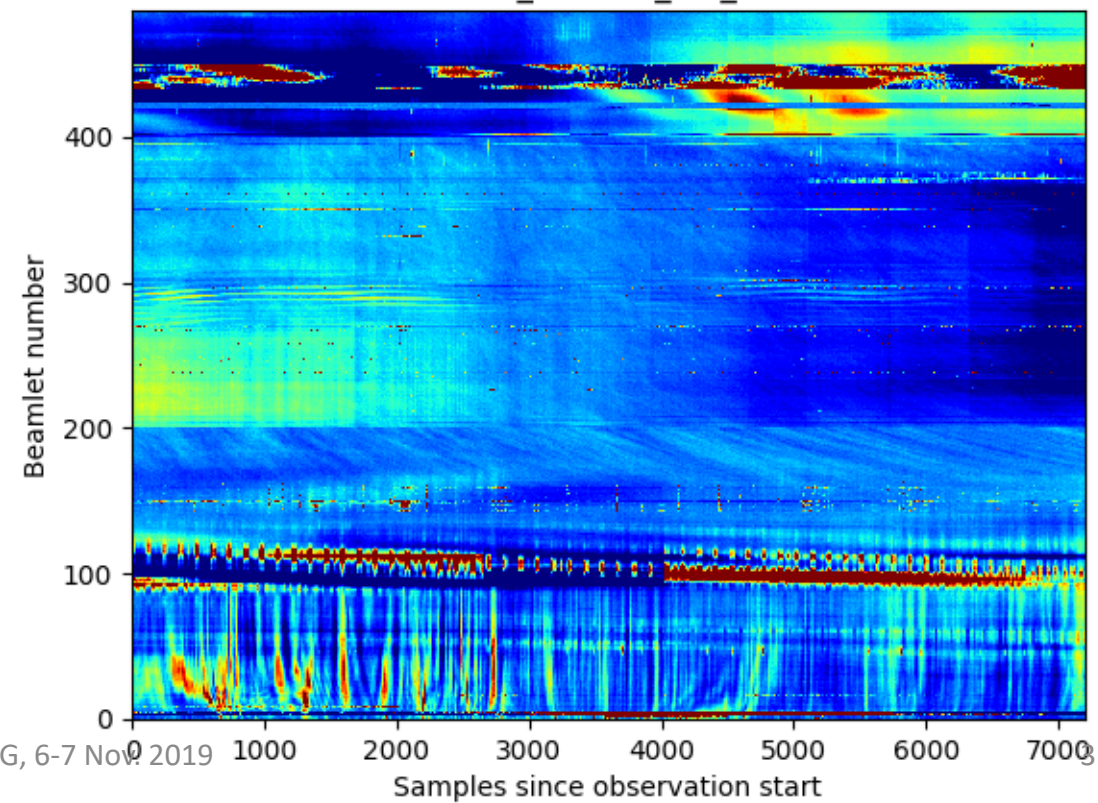
• Some problems with scintillation data?

Cyg A

Cas A

20191029_181931_bst_00X.dat

20191029_202346_bst_00X.dat

Solar group

– Grant acquisition: **LOFAR observations of the solar corona during Parker Solar Probe perihelion passages** (Bethoveen Clasic 3 program), the grant will be implemented together with Leibniz Institute for Astrophysics Potsdam (Christian Vocks and Gottfried Mann).

– Participation in various international proposals for LOFAR observations in the frame of the KSP Solar Physics and Space Weather group.

Type III radio bursts observations with Polish LOFAR station in Bałdy
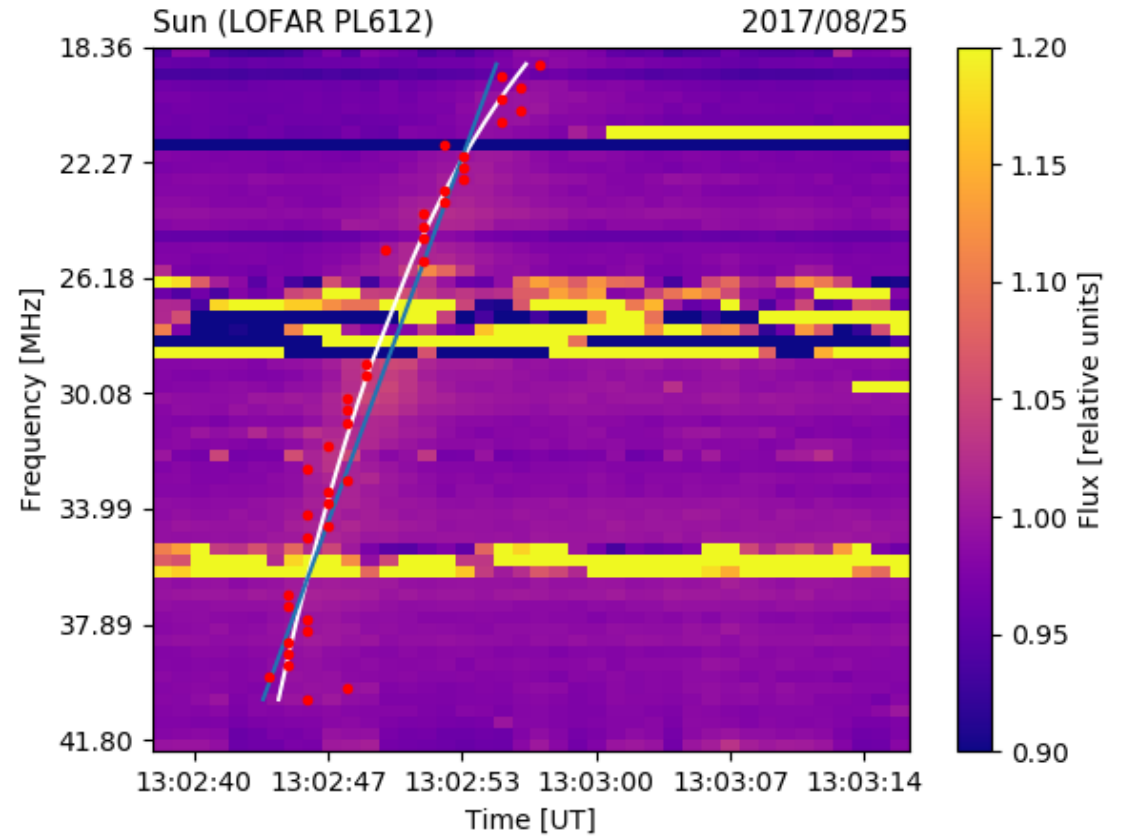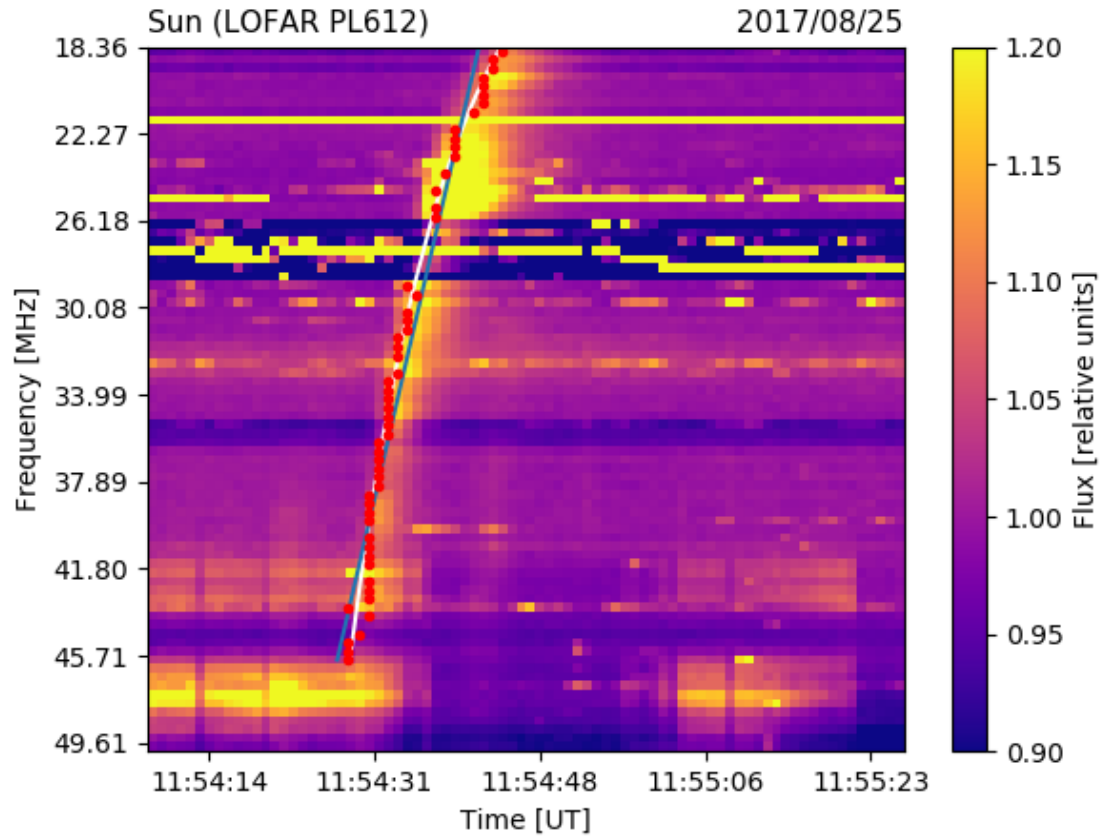
Pulsar Group

Python program for semi-automatic analysis of pulsar observation

- What exacly algorithm do?
  - Searching for unanalised pulsar data
  - Scruching polarisation to total intensity (using pam from PSRchive)
  - Checks if subints range matches in all files
  - Adding files in frequency diraction (using psradd from PSRchive)
  - Sends sumed files for manual noise deleting (using pazi from PSRchive)
  - Scrunches frequency to get 6 profiles from data (pam)
  - Exports profiles to ascii text file with header (using pdv from PSRchive)
  - Plots profiles

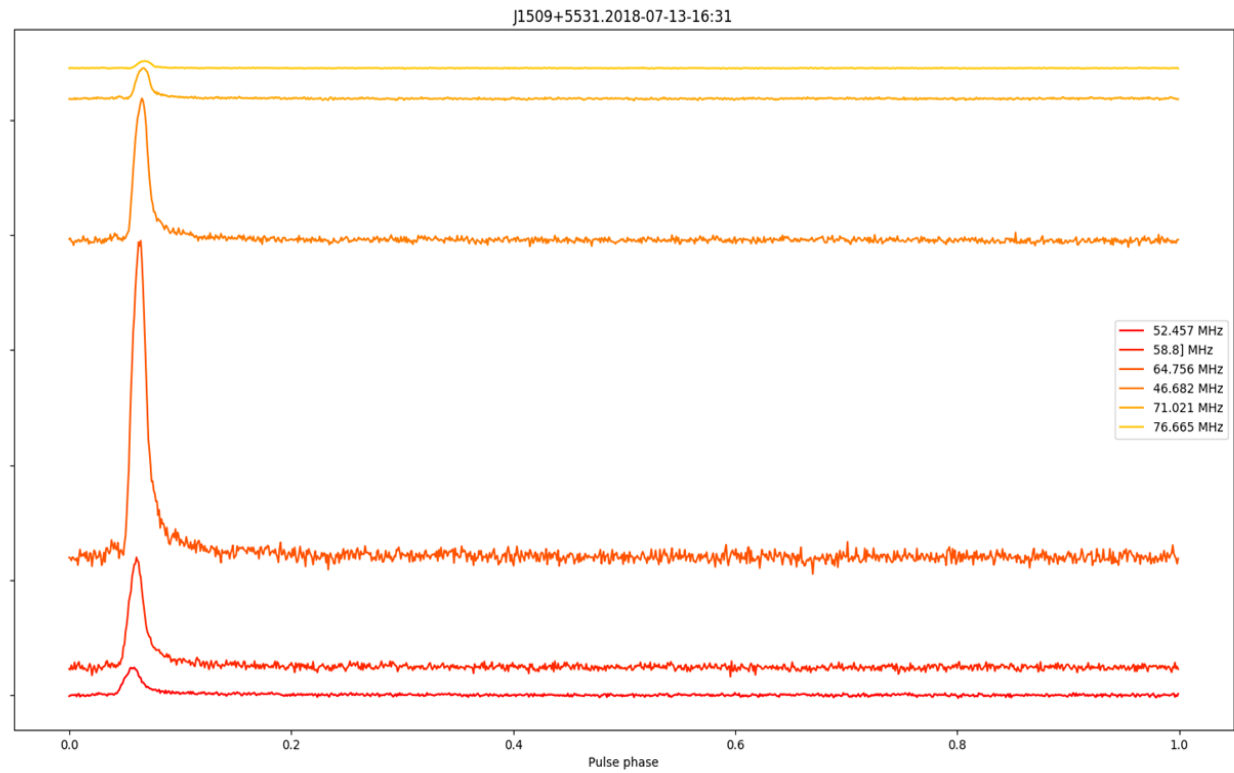# Inputs and outputs from script

Inputs:

- Path to folder containing data (string value)

- Option to algorithm work only to adding step (automation process)*

- Option to algorithm work only from deleting noise to ploting (semi-automatic)*

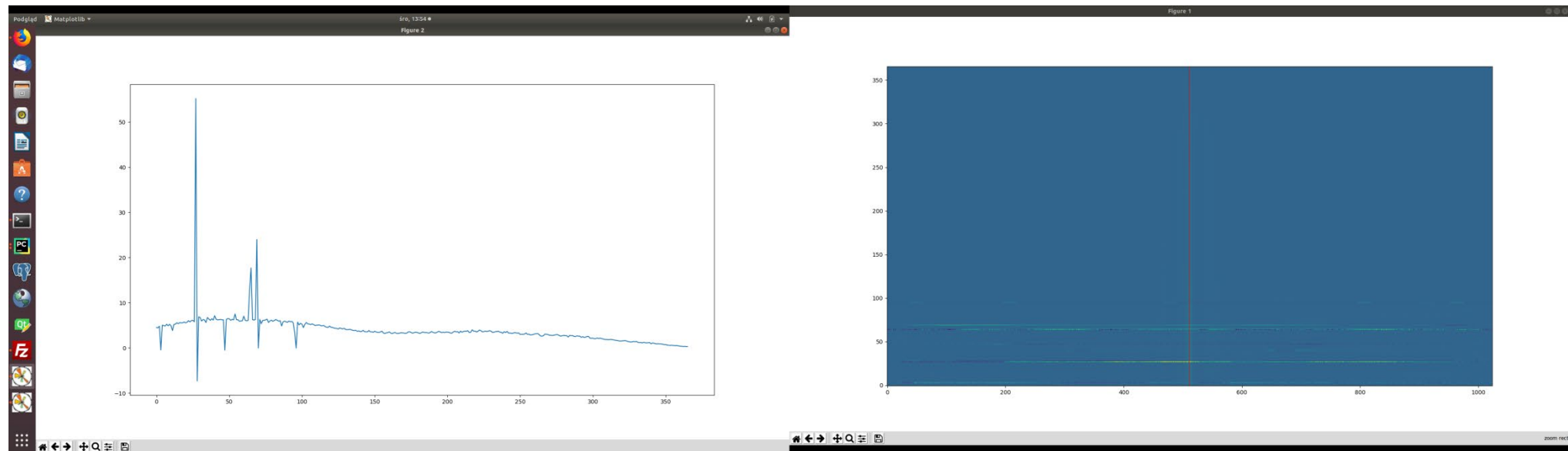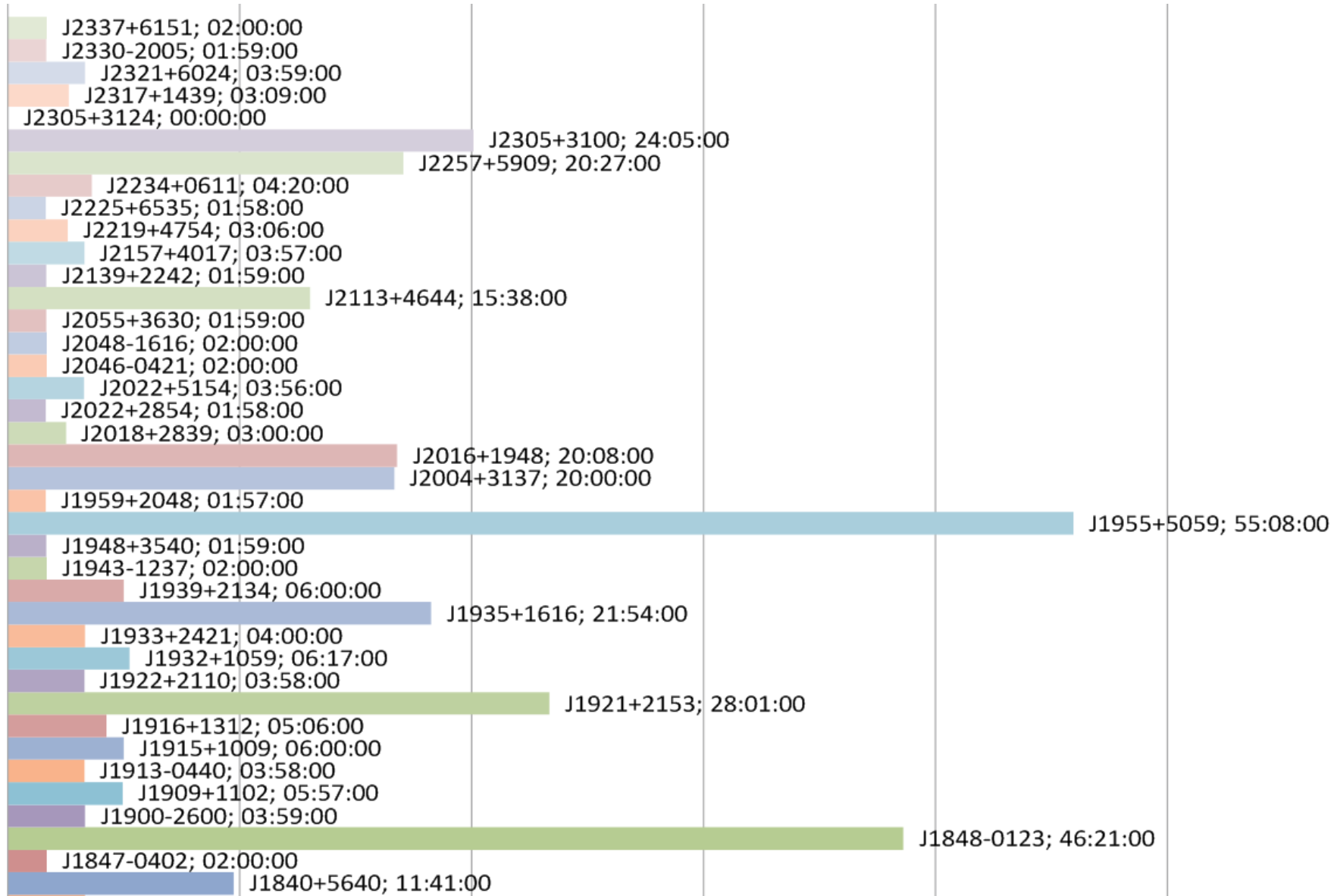- *can be combined together

Outputs:

- Ascii text files with data

- Ploted profiles

Example plot made by script:

Python script for searching big pulses

J2337+6151; 02:00:00
J2330-2005; 01:59:00
J2321+6024; 03:59:00
J2317+1439; 03:09:00
J2305+3124; 00:00:00
J2305+3100; 24:05:00
J2257+5909; 20:27:00
J2234+0611; 04:20:00
J2225+6535; 01:58:00
J2219+4754; 03:06:00
J2157+4017; 03:57:00
J2139+2242; 01:59:00
J2113+4644; 15:38:00
J2055+3630; 01:59:00
J2048-1616; 02:00:00
J2046-0421; 02:00:00
J2022+5154; 03:56:00
J2022+2854; 01:58:00
J2018+2839; 03:00:00
J2016+1948; 20:08:00
J2004+3137; 20:00:00
J1959+2048; 01:57:00
J1955+5059; 55:08:00
J1948+3540; 01:59:00
J1943-1237; 02:00:00
J1939+2134; 06:00:00
J1935+1616; 21:54:00
J1933+2421; 04:00:00
J1932+1059; 06:17:00
J1922+2110; 03:58:00
J1921+2153; 28:01:00
J1916+1312; 05:06:00
J1915+1009; 06:00:00
J1913-0440; 03:58:00
J1909+1102; 05:57:00
J1900-2600; 03:59:00
J1848-0123; 46:21:00
J1847-0402; 02:00:00
J1840+5640; 11:41:00

liczba godzin

- Until doday the observations of 111 pulsars have been done (76 with detection > 10 σ)
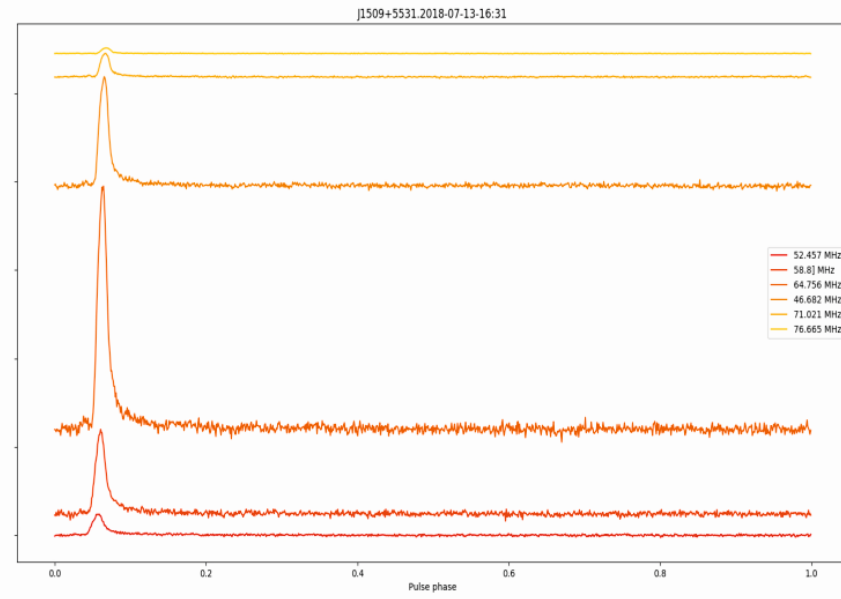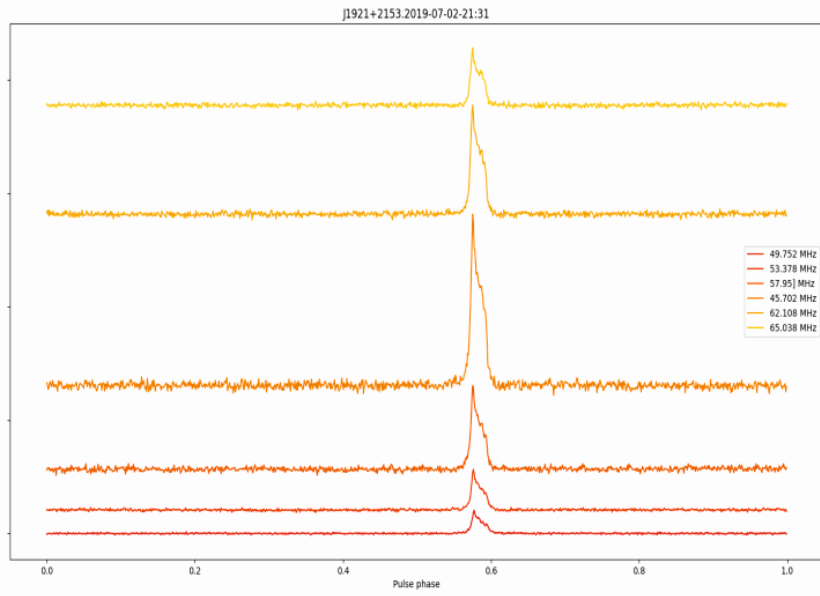- The total observation time exceeds 1000 hours
- with typically 1 and 2 hour durations and with 10s integrations. We also do single pulse mode observations for selected pulsars.

- The LBA observations are carried out using the PL611station. So far, about 25 pulsars have been observed on the LBA, of which 12 are in constant observations (on average every 3 weeks).

- Due to the fact that the HBA field of the PL611 station is only 48 panels (half of the typical configuration of ILT stations), permanent observations of about 40 pulsars (on average once a month) - scattering, interstellar scintillation observations and recently also single pulses have been conducted.

a)

J1921+2153.2019-07-02-21:31

—	49.752 MHz
—	53.378 MHz
—	57.95] MHz
—	45.702 MHz
—	62.108 MHz
—	65.038 MHz

J1509+5531.2018-07-13-16:31

—	52.457 MHz
—	58.8] MHz
—	64.756 MHz
—	46.682 MHz
—	71.021 MHz
—	76.665 MHz

b)

J1921+2153.2017-07-01-02:20

—	136.59 MHz
—	147.84 MHz
—	159.74 MHz
—	124.03 MHz
—	171.74 MHz
—	183.65 MHz

J1509+5531.2017-07-14-17:00

—	136.39 MHz
—	147.85 MHz
—	159.76 MHz
—	124.28 MHz
—	171.66 MHz
—	183.59 MHz