BILATERAL WORKSHOP ON ASTROPHYSICS
V.N. KARAZIN KHARKIV NATIONAL UNIVERSITY – INAF

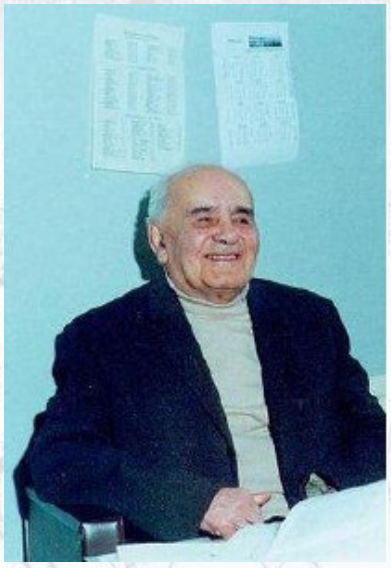
RADIOASTRONOMY IN UKRAINE

22-23, March 2018, Rome, Italy

O.M. Ulyanov and UTR-2, URAN, GURT team

Institute of Radio Astronomy of NAS of Ukraine

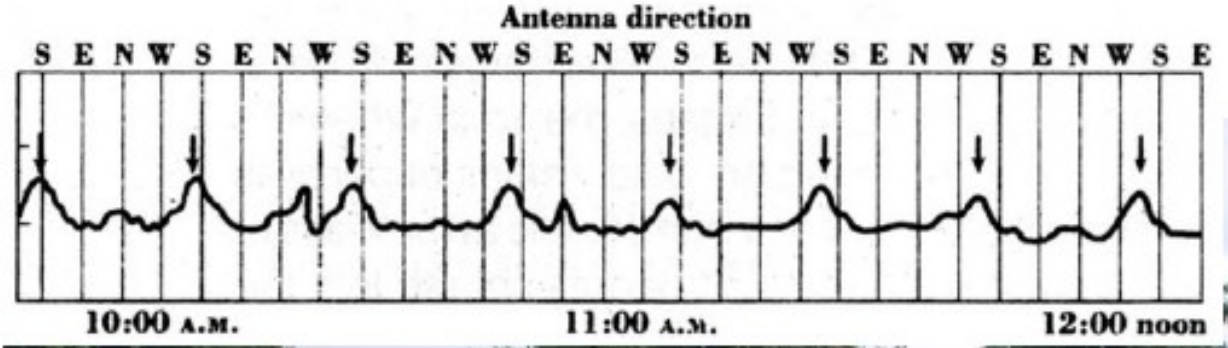
oulyanov@rian.kharkov.ua



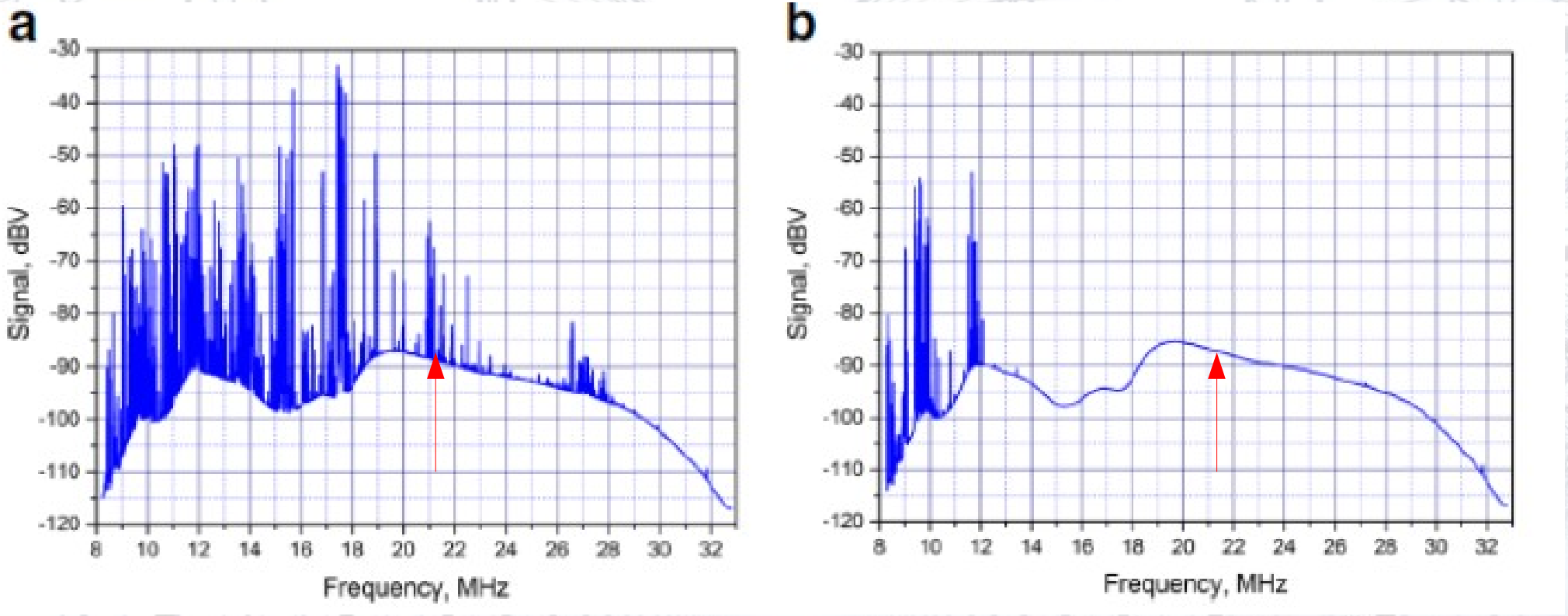
Radio Astronomy birthday is August 1931;

λ = 14 m; f = 21.428 MHz

Karl Jansky (1905-1950) is the father of Radio Astronomy

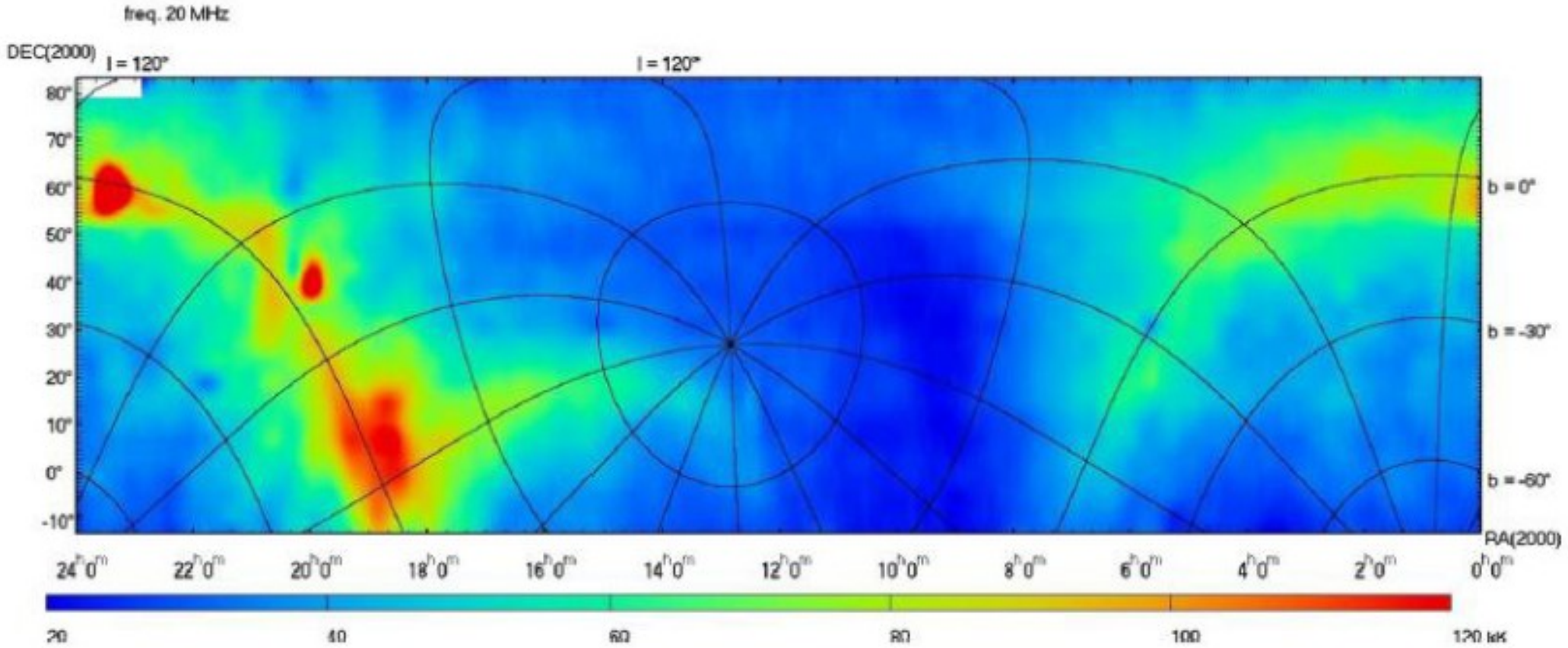


Frequency range where Radio Astronomy was born



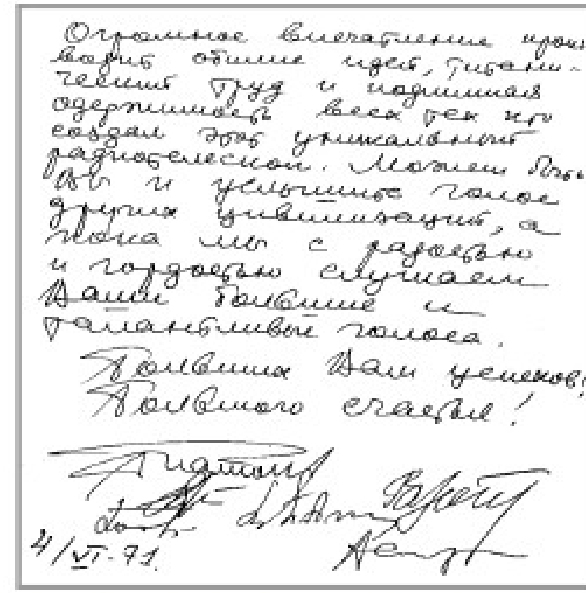
RFI superimposed with to the Galactic background spectrum as measured by UTR-2 during **a)** a day and **b)** a night on December 11, 2015. Integration time is ~ 100 sec and frequency resolution is 4 kHz.

The Galaxy background map at frequency 20 MHz



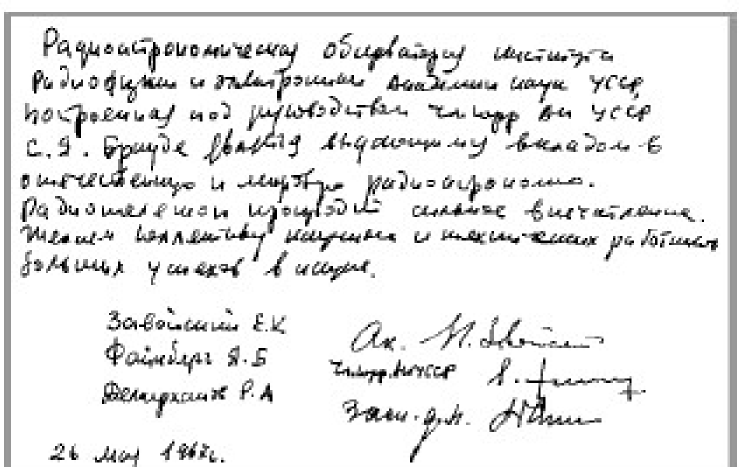
Large-scale (α x δ ~ 11º x 7º) map of the Northern Sky brightness temperature (combined from UTR-2 and URAN-2 data).

40-ty and more years after K. Jansky


Огромное впечатление произвели общие идеи, титанический труд и подлинная одержимость всех тех кто создал этот уникальный радиотелескоп. Может быть мы и услышим голоса других цивилизаций, а пока мы с радостью и гордостью слушаем Ваши большие и талантливые голоса.

Больших Вам успехов!
Большого счастья!

4/VI-71.


Радиоастрономическая обсерватория института радиофизики и электроники Академии наук УССР построенная под руководством чл.корр. АН УССР С.Я. Брауде является выдающимся вкладом в отечественную и мировую радиоастрономию. Радиотелескоп производит сильное впечатление. Желаем коллективу научных и технических работников больших успехов в науке.

Завойский Е.К.
Файнберг Я.Б.
Демирханов Р.А.
Ак.
Чл.корр. АН СССР
Зам.-дир.

26 мая 1967г.

Main Directions of Scientific Research of IRA NASU

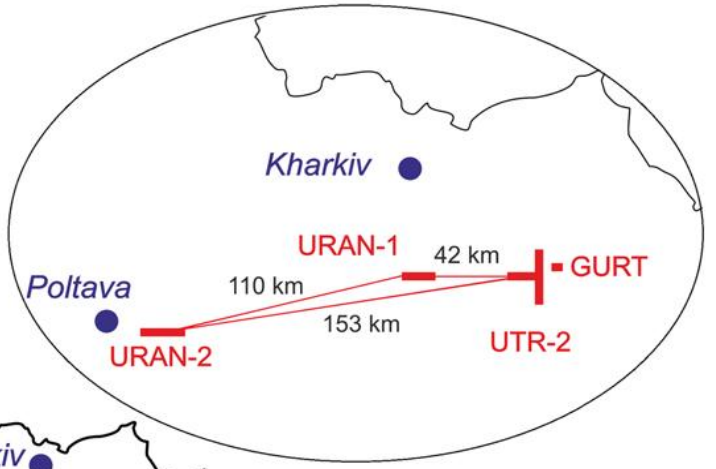
Astrophysics and Radioastronomy of Universe (all objects)

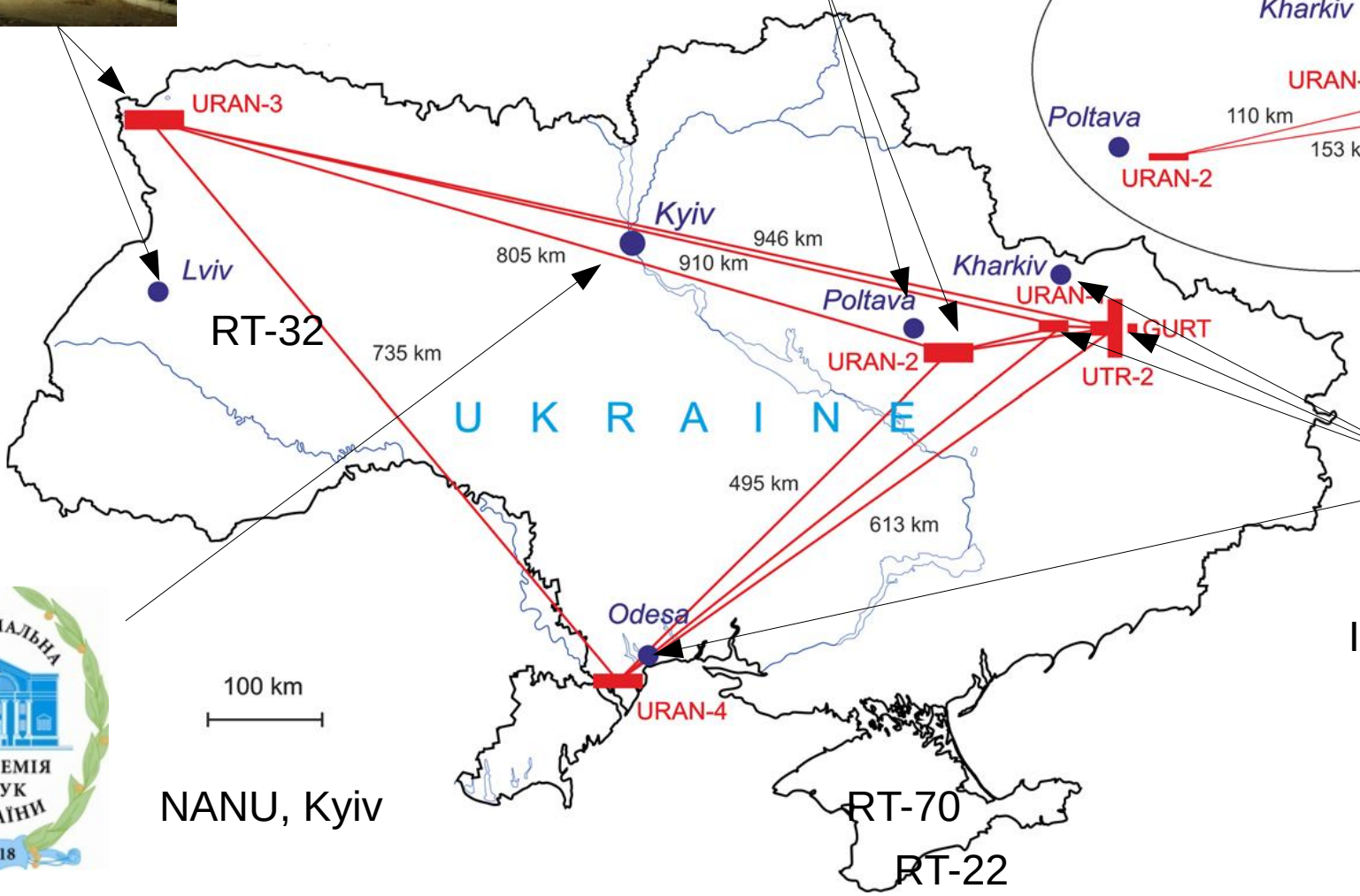
Remote Sensing of Ionosphere and Solar System

Development and Designing of Radio Telescopes and Radio Remote Sensing Systems

PhMI NASU, Lviv

PGO NASU, Poltava





IRA NASU, Kharkiv

NANU, Kyiv

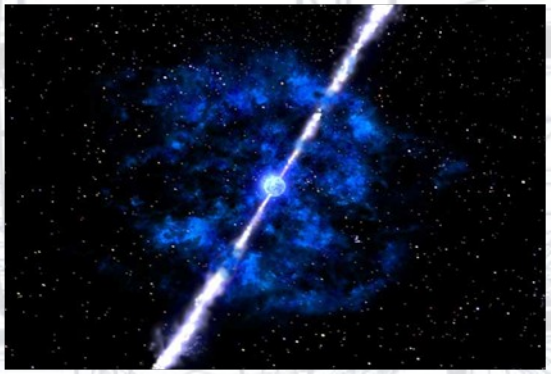
Positions of the Ukrainian Radio Telescopes UTR-2, URAN 1-4, GURT into Ukraine map

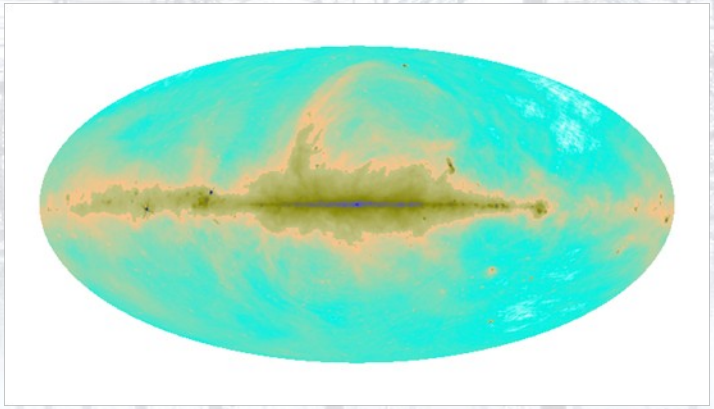
Objects of investigation of low frequency radio astronomy

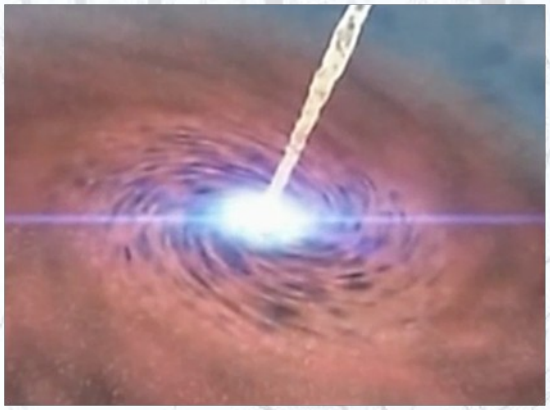
Earth	Ionosphere	
	Magnetosphere	
	Cosmic ray air shower	
	Meteor events	
	Ground parameters	
Solar System	The Sun	Quiet
		Active
		Radar
	Jupiter	
	Planet (Saturn) lightning	
	Inter-planetary medium	Stintillation
		VLBI
		Radiography
	The Moon	Occultation
		Radar
		Cosmic ray secondary radio emission

Objects of investigation of low frequency radio astronomy

GALAXY	Pulsars
	Radio recombination lines
	Active Stars
	Exoplanets
	Transients
	Non-thermal background
	Supernova remnants
	H II Regions
METAGALAXY	Galaxies
	Radio Galaxies
	Quasars
	Radio Source Catalogue
	Galactic Clusters
	Unidentified Objects
	Transients



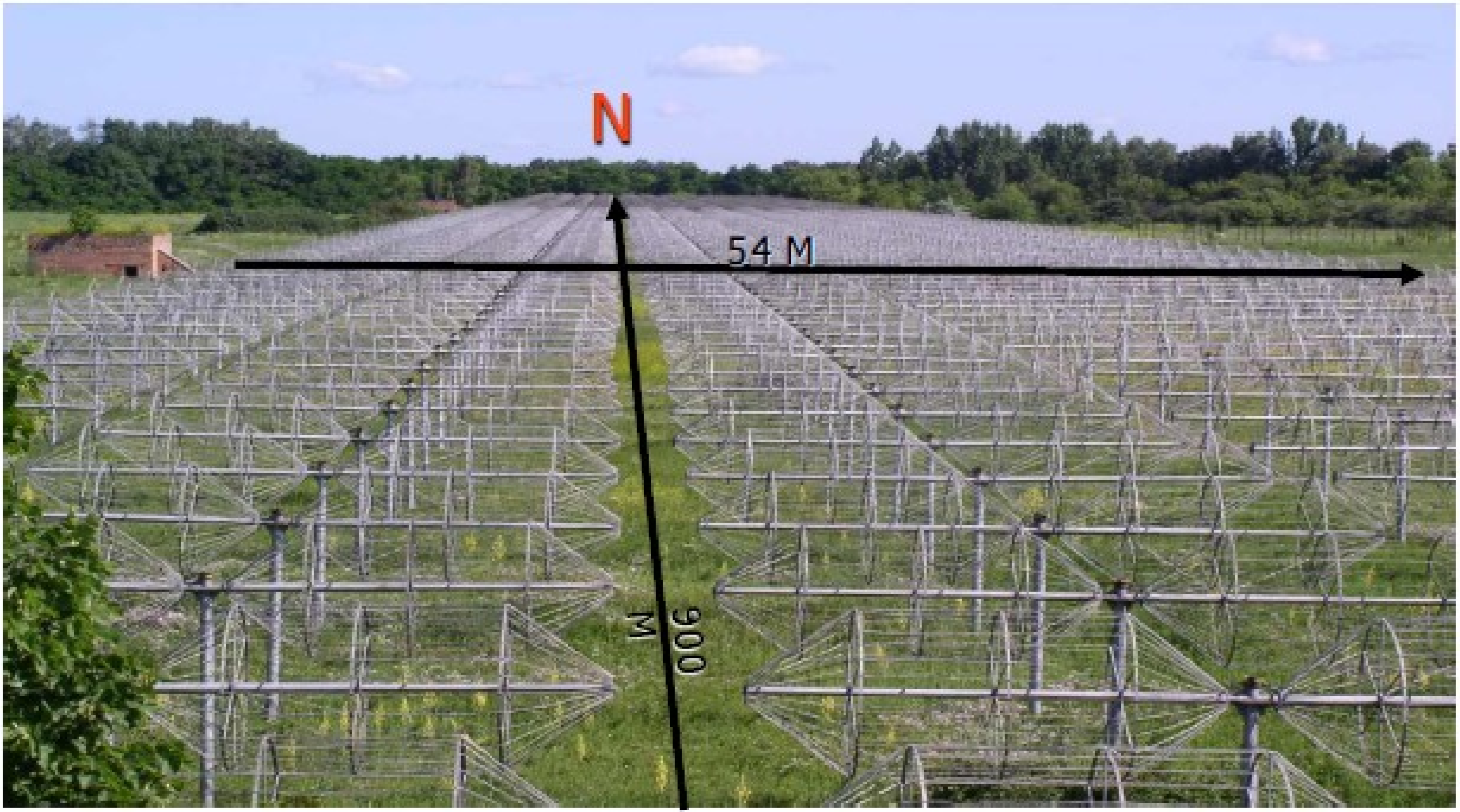




Ukrainian Decameter Radio Telescopes

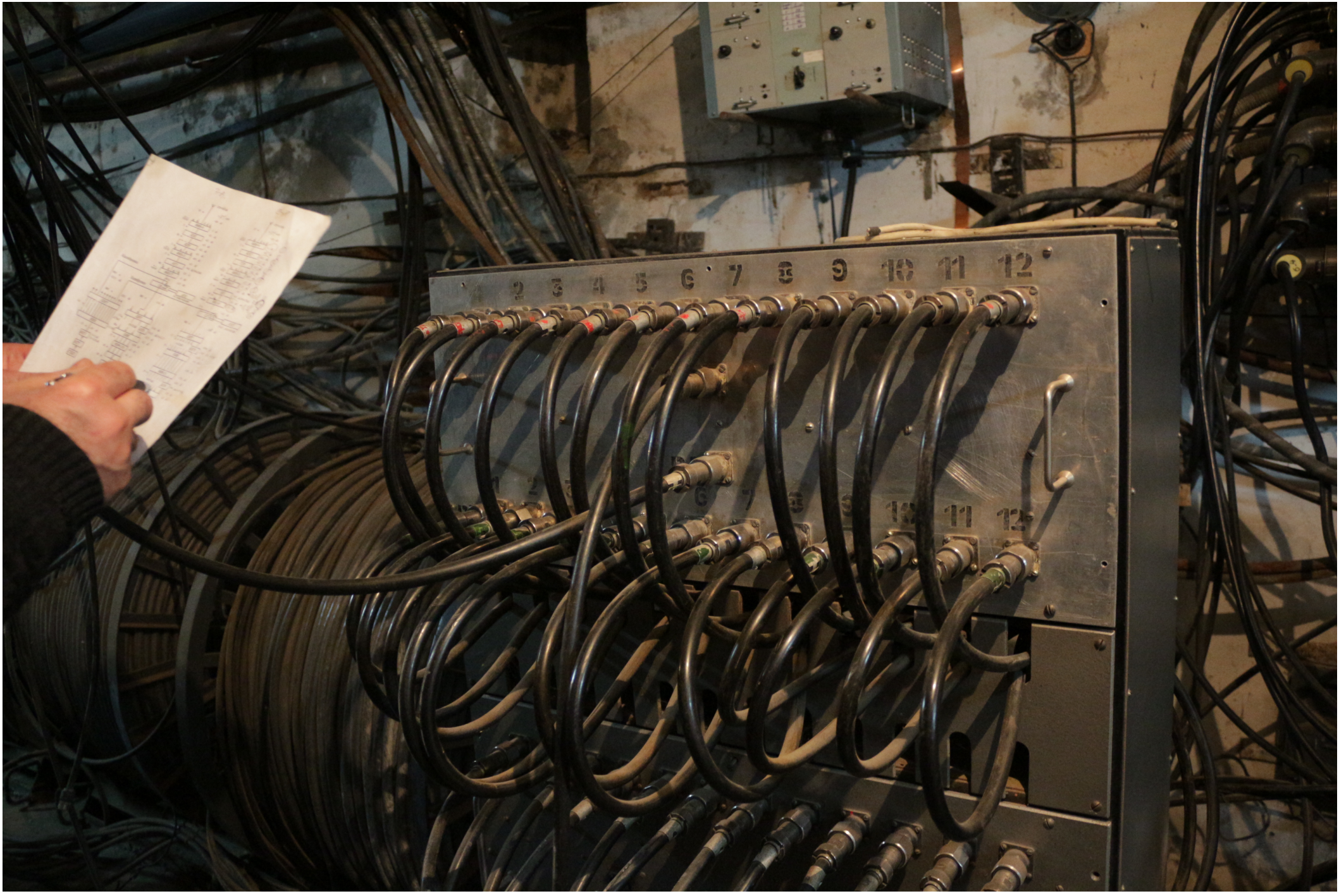
The Largest Radio Telescope at Decameter Wavelengths UTR-2

North arm of UTR-2 Radio Telescope



Radio Telescopes of the URAN system. Frequency range 8…32 MHz.

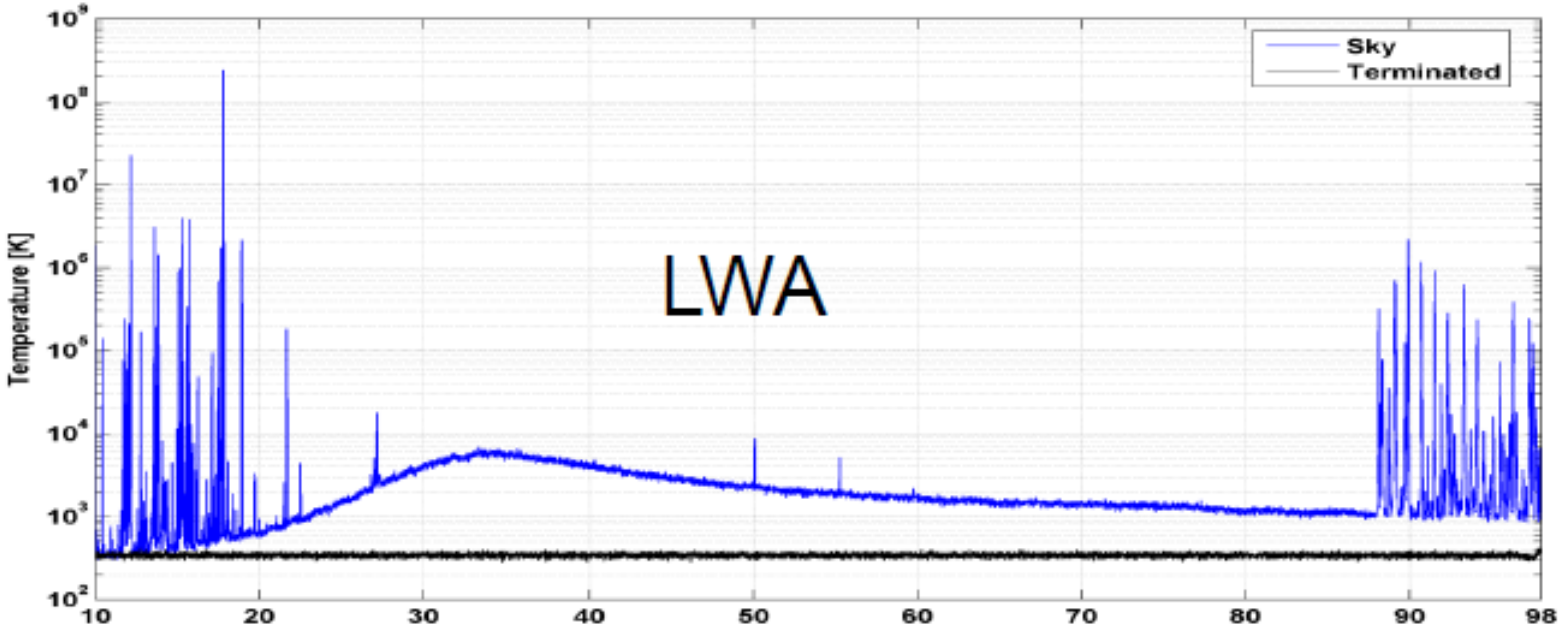
Huge Phase Shifters (left side)

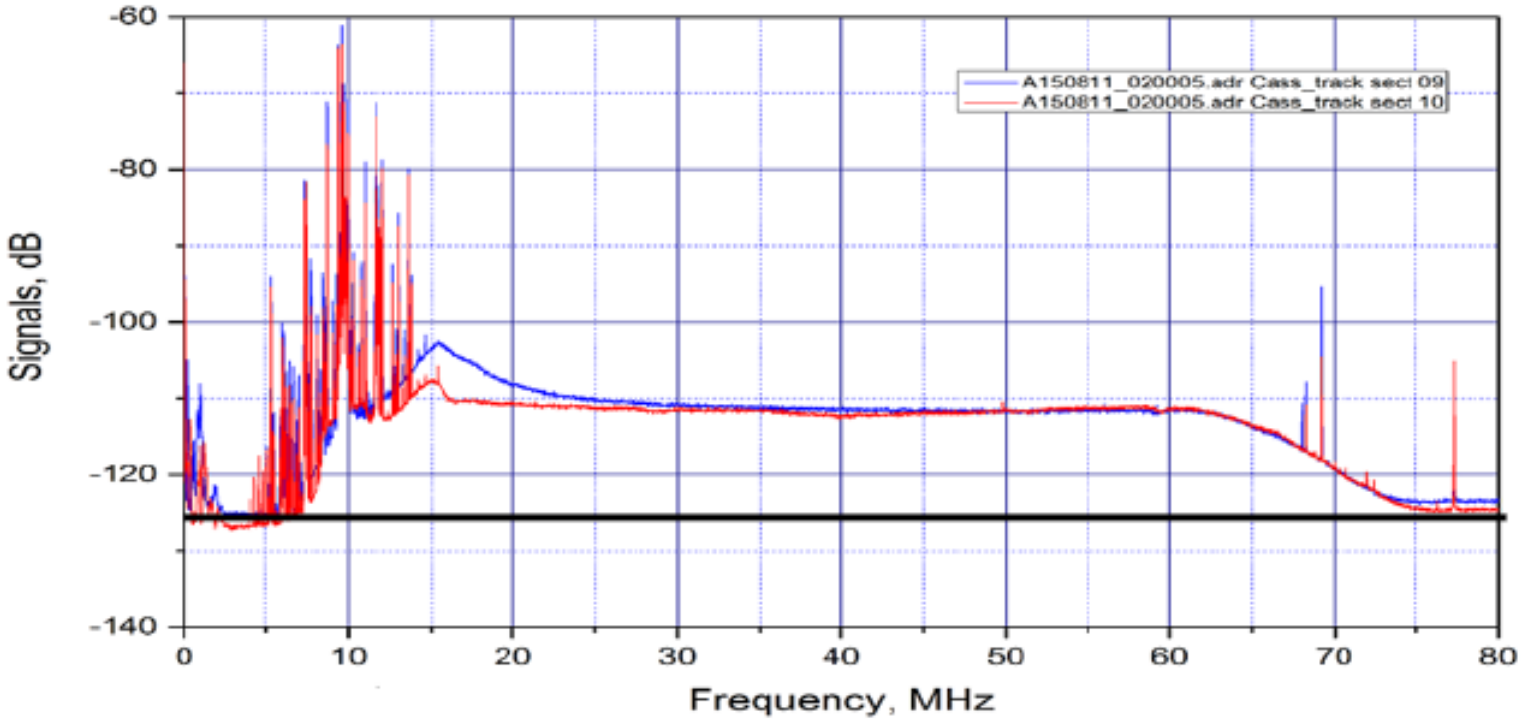


Behavior control of one section of UTR-2

New type of Radio Telescope GURT

Comparison of the LWA and GURT transfer characteristics





Workshop with colleagues Paris-Meudon-Nancey observatories (UTR-2 radio telescope 2011)

Ukraine-France collaboration in the frame of the Paris Observatory Project

"Coordinated observations of the transients at the low frequencies by using largest new generation radio telescopes" including of the GURT and Nenu FAR creation

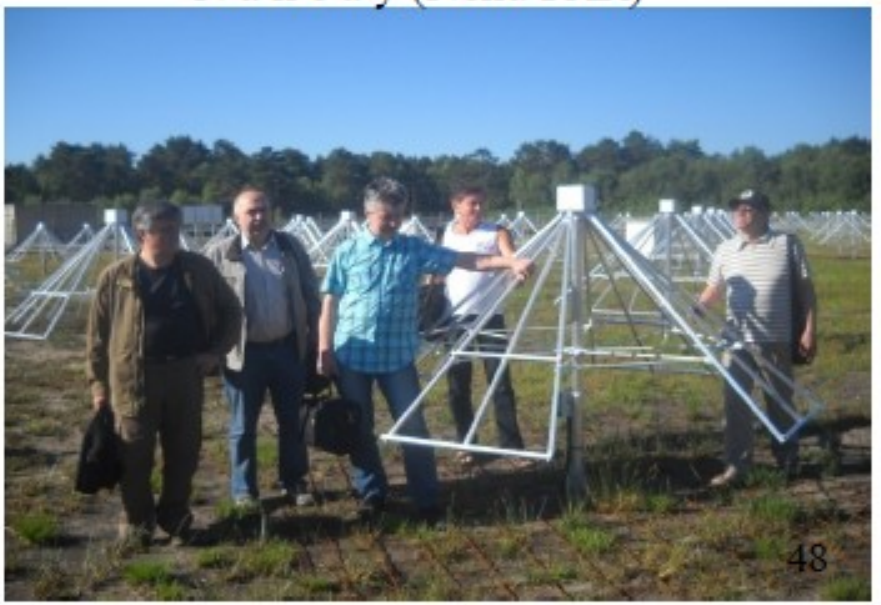
(Paris-Meudon-Nancay Observatories, June 2015)

Paris

Meudon

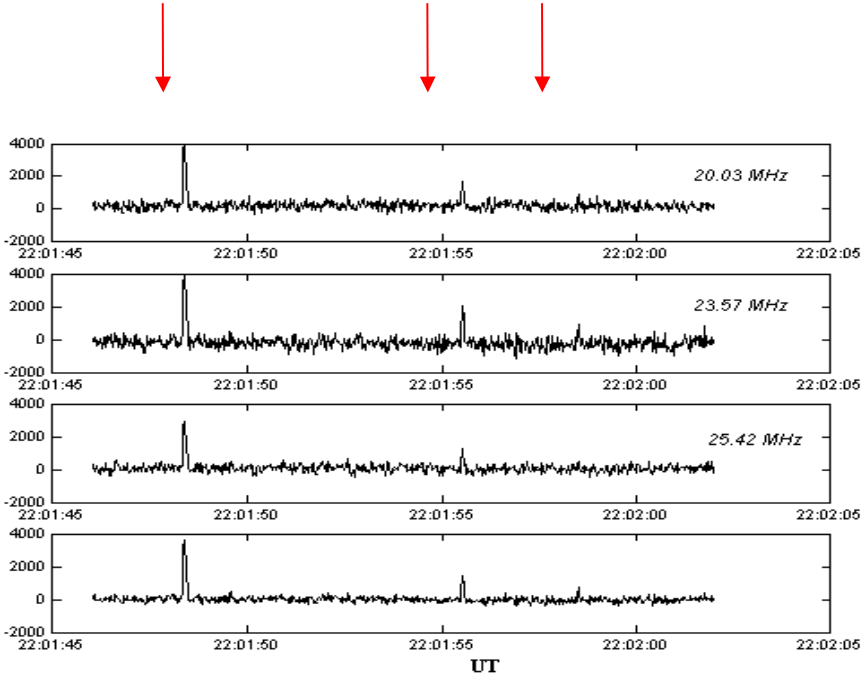
Nancay

Nancay (Nenu FAR)

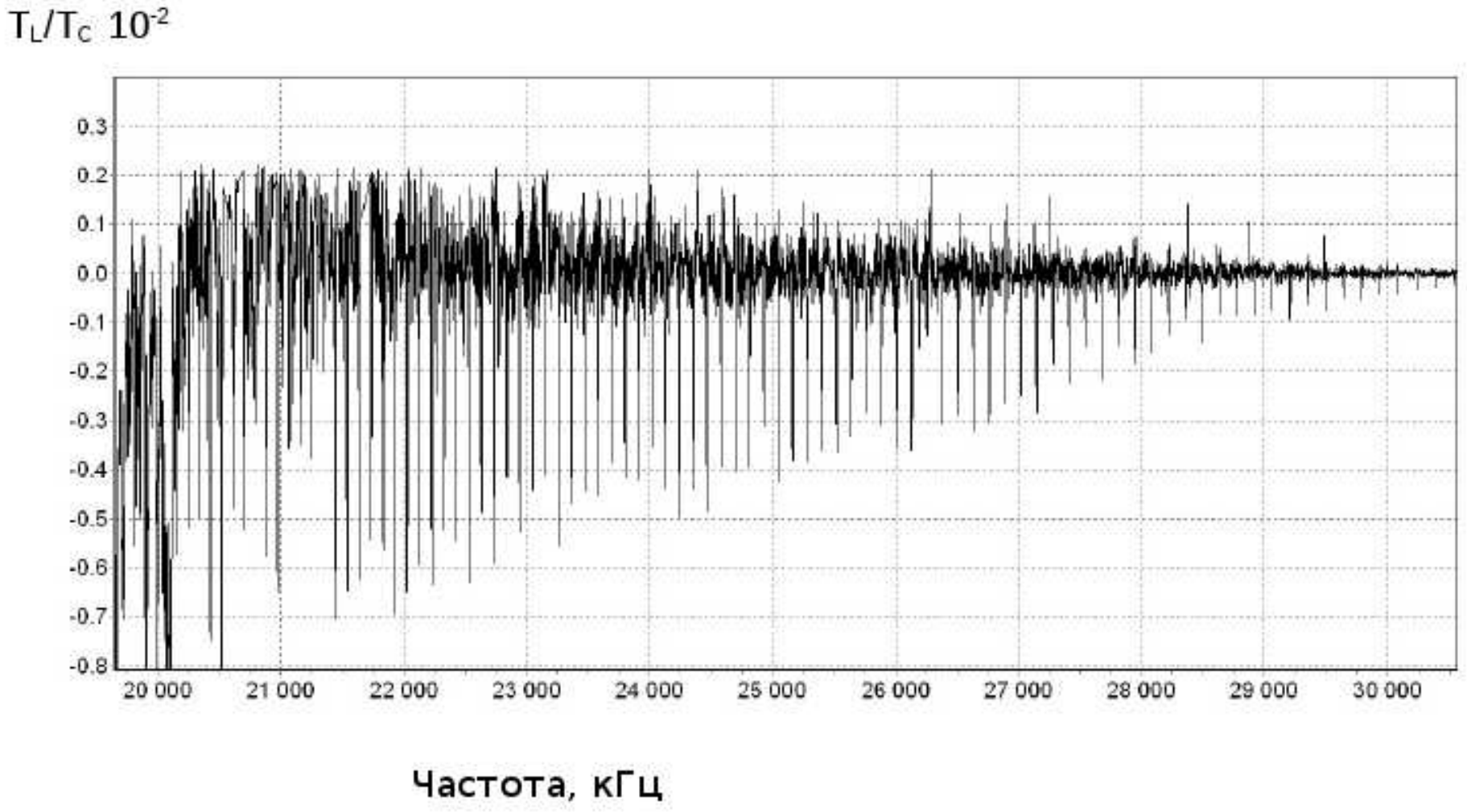


Discovery of Saturn's Electrostatic Discharges (ligtnings)

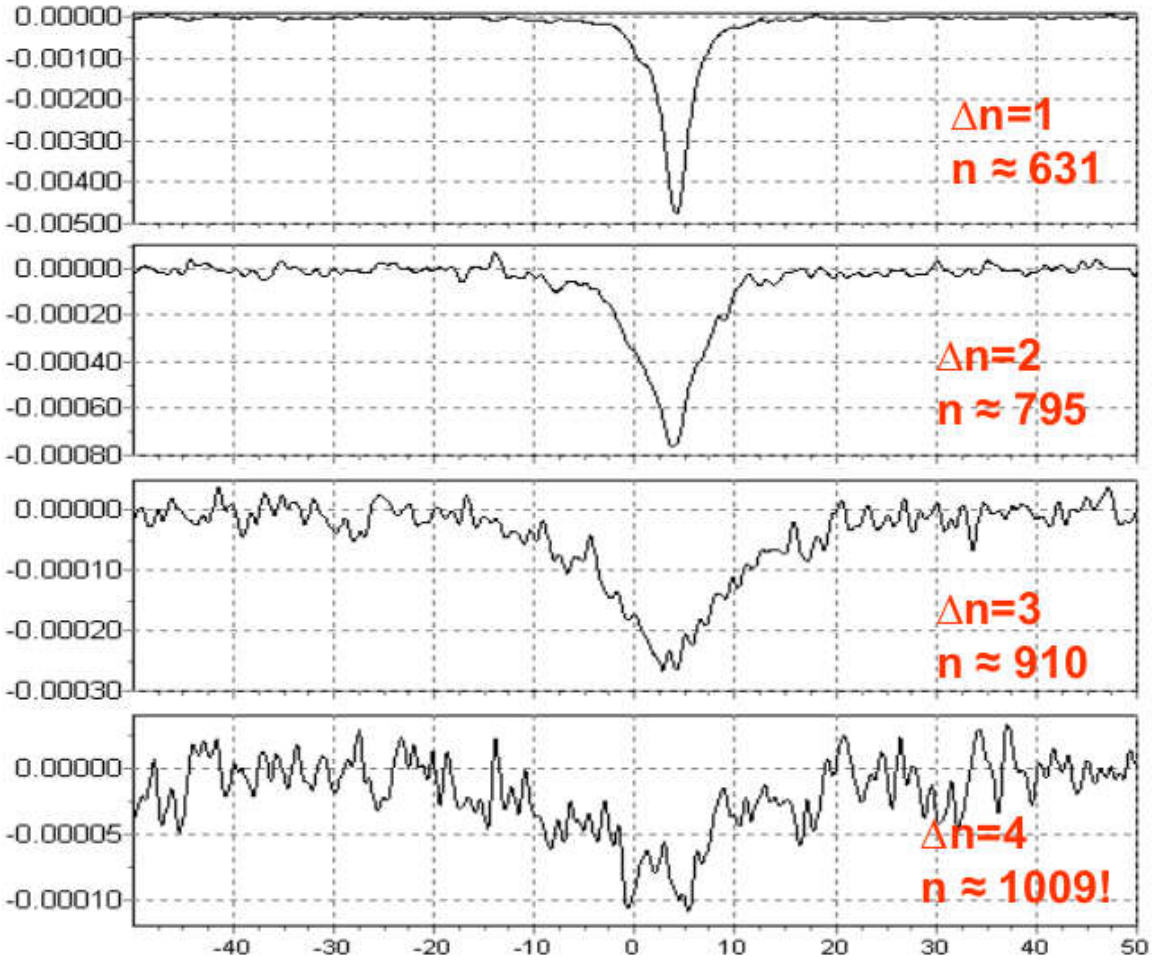
Cassini Spacecraft near Saturn (ESA-NASA Project)



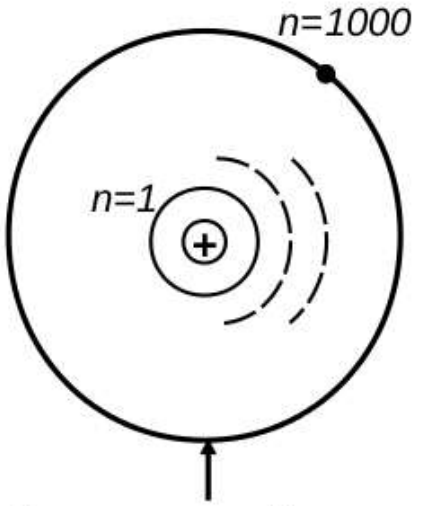
Carbon RRL at Decameter Range (300 absorbtion lines from 20 up to 33 MHz)



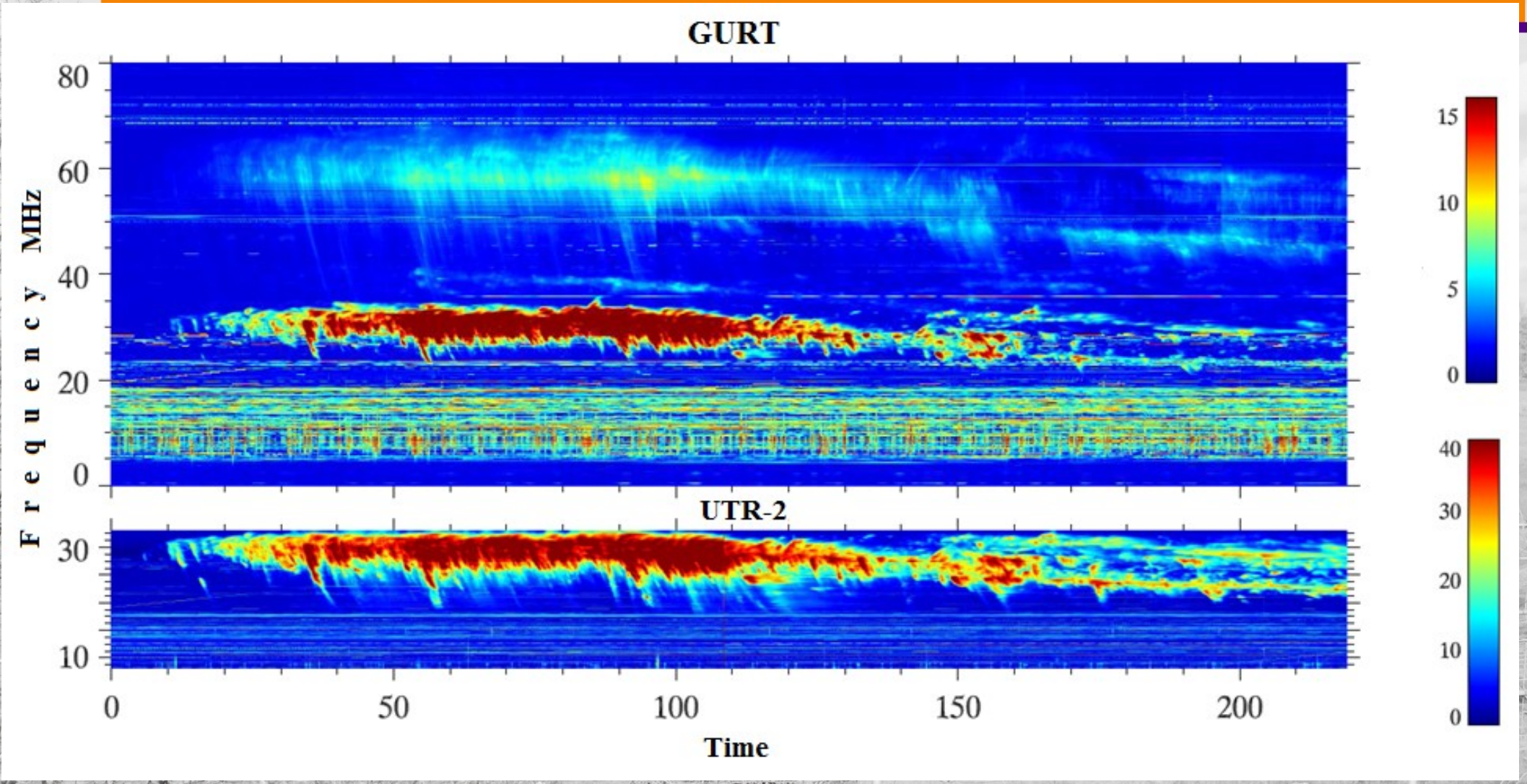
α, β, γ, δ Recombination Radio Lines at 26 MHz



D ≈ 0.1 мм !

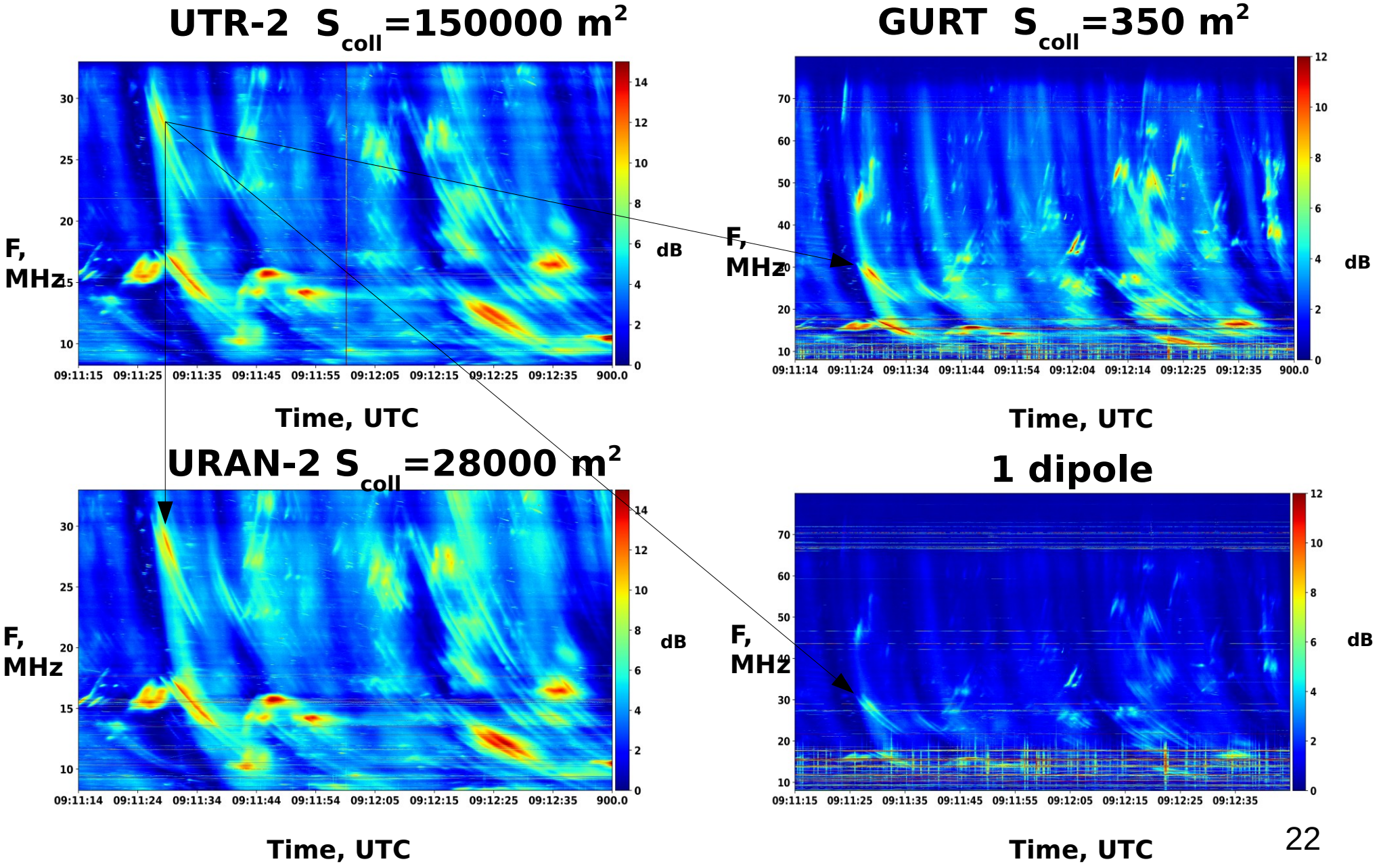


Гігантський атом



Type II Solar bursts observed by GURT (top) and UTR-2 (bottom) on 25.07.2014. The start is 07:11:15 UT

Simultaneously observations of Solar drift pars (July 2017)



Current Juno mission, 2015-2017

(Ukrainian Radiotelescopes are important segment of Earth supporting of JUNO mission)

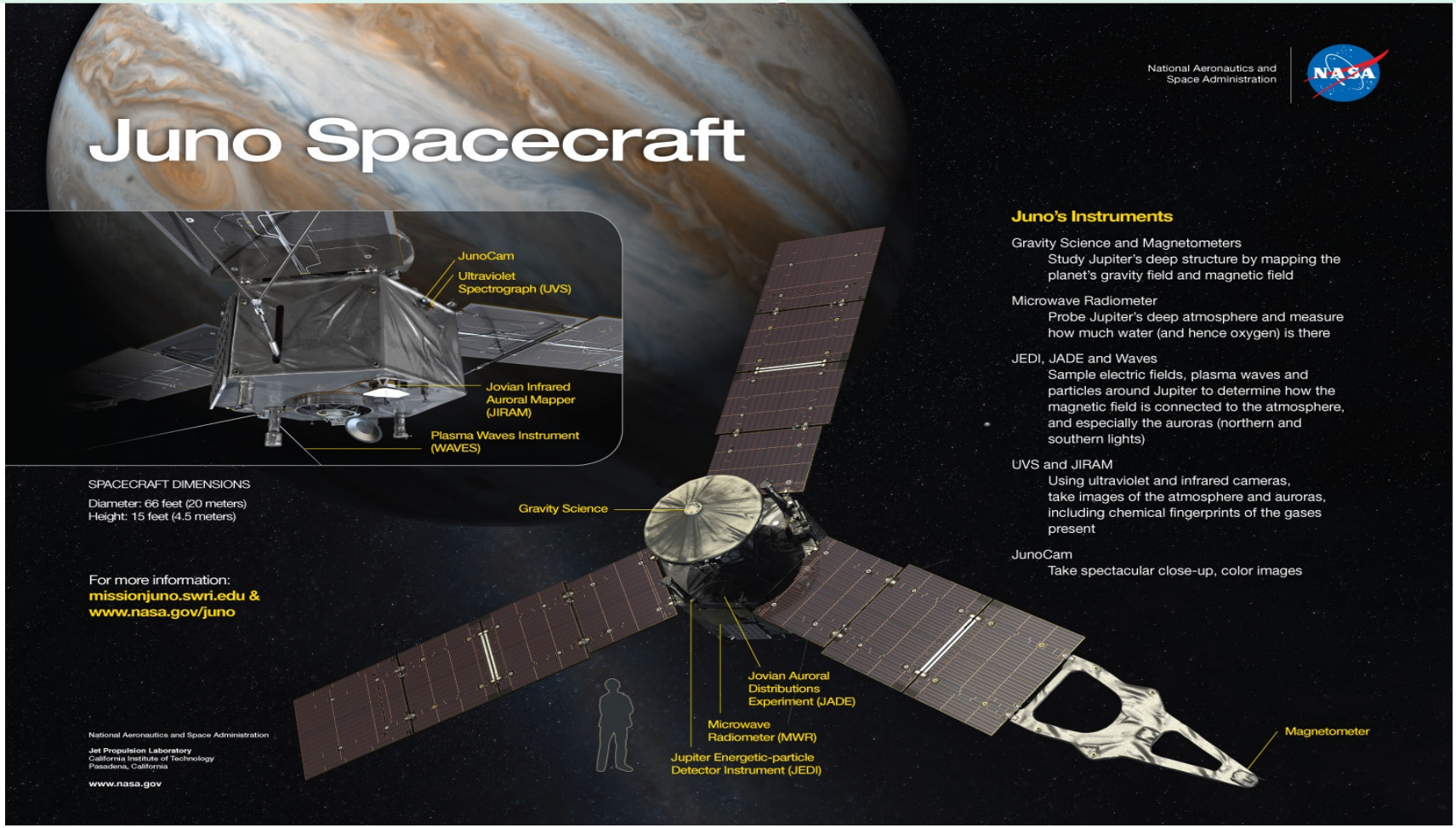
A gravity/radio science system (Gravity Science)

A six-wavelength microwave radiometer for atmospheric sounding and composition (MWR)

A vector magnetometer (MAG)

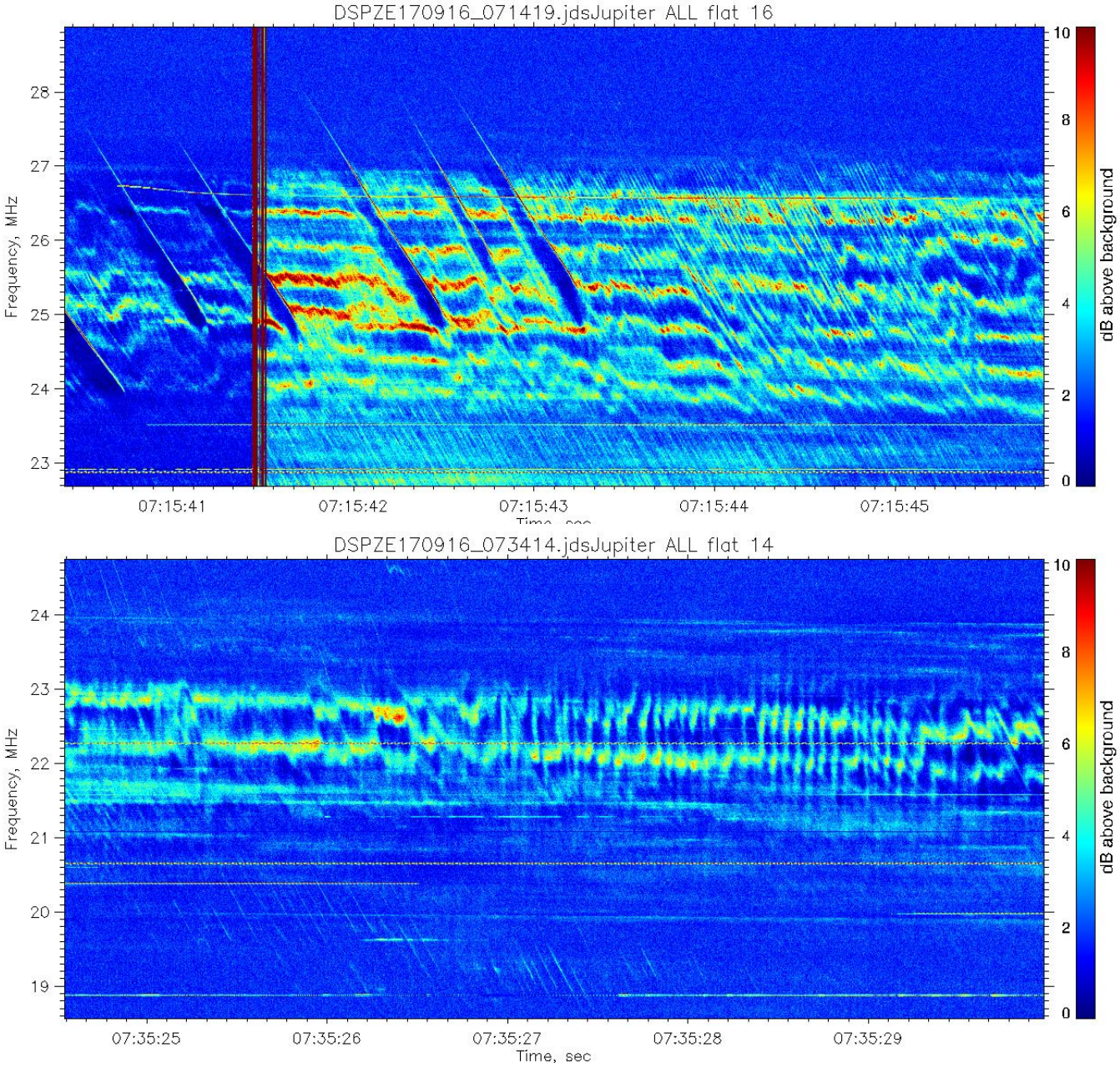
Plasma and energetic particle detectors (JADE and JEDI)

- A radio/plasma wave experiment (Waves)
- An ultraviolet imager/spectrometer (UVS)
- An infrared imager/spectrometer (JIRAM)
- The spacecraft will also carry a color camera, called JunoCam, to provide the public with the first detailed glimpse of Jupiter's poles.

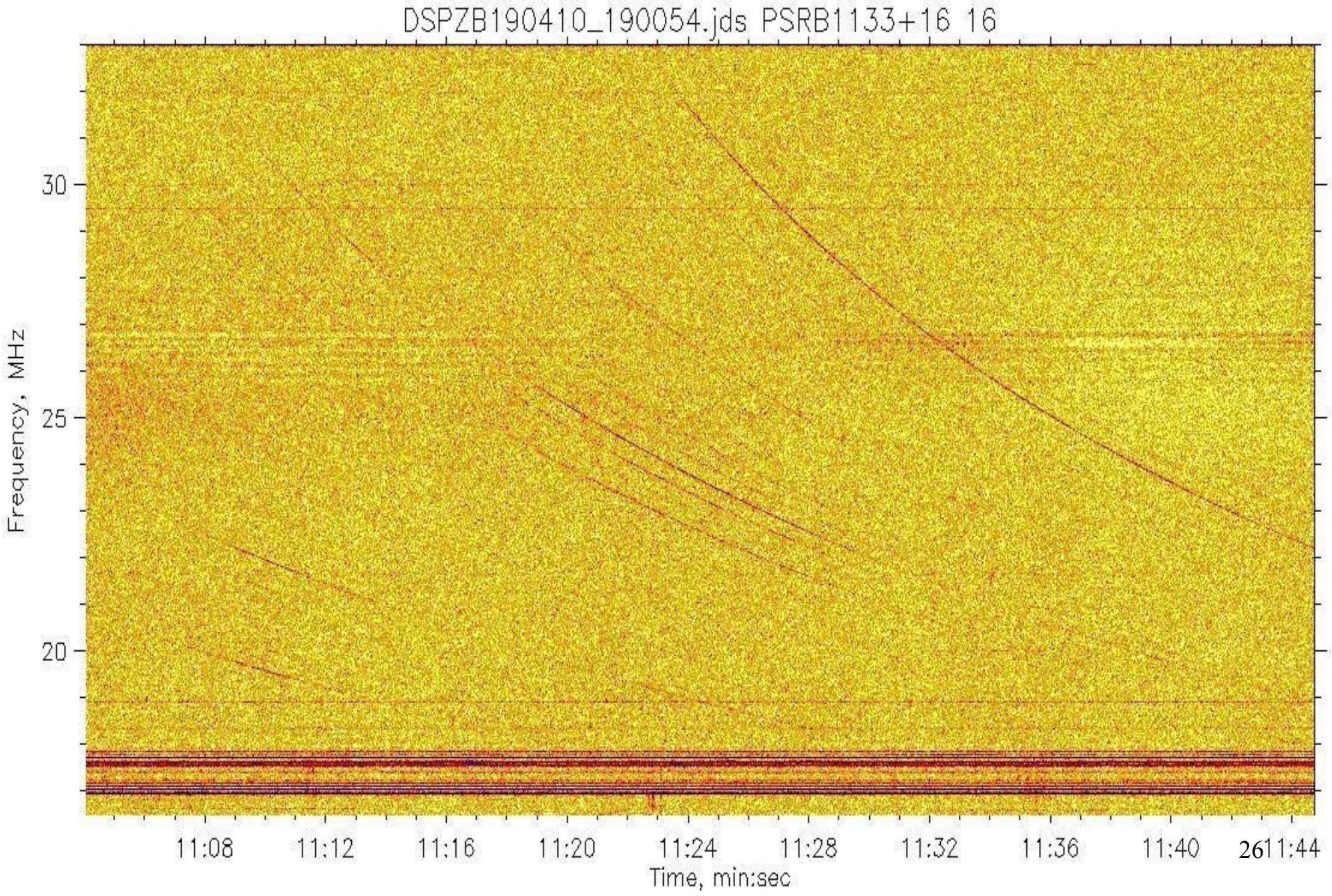


24

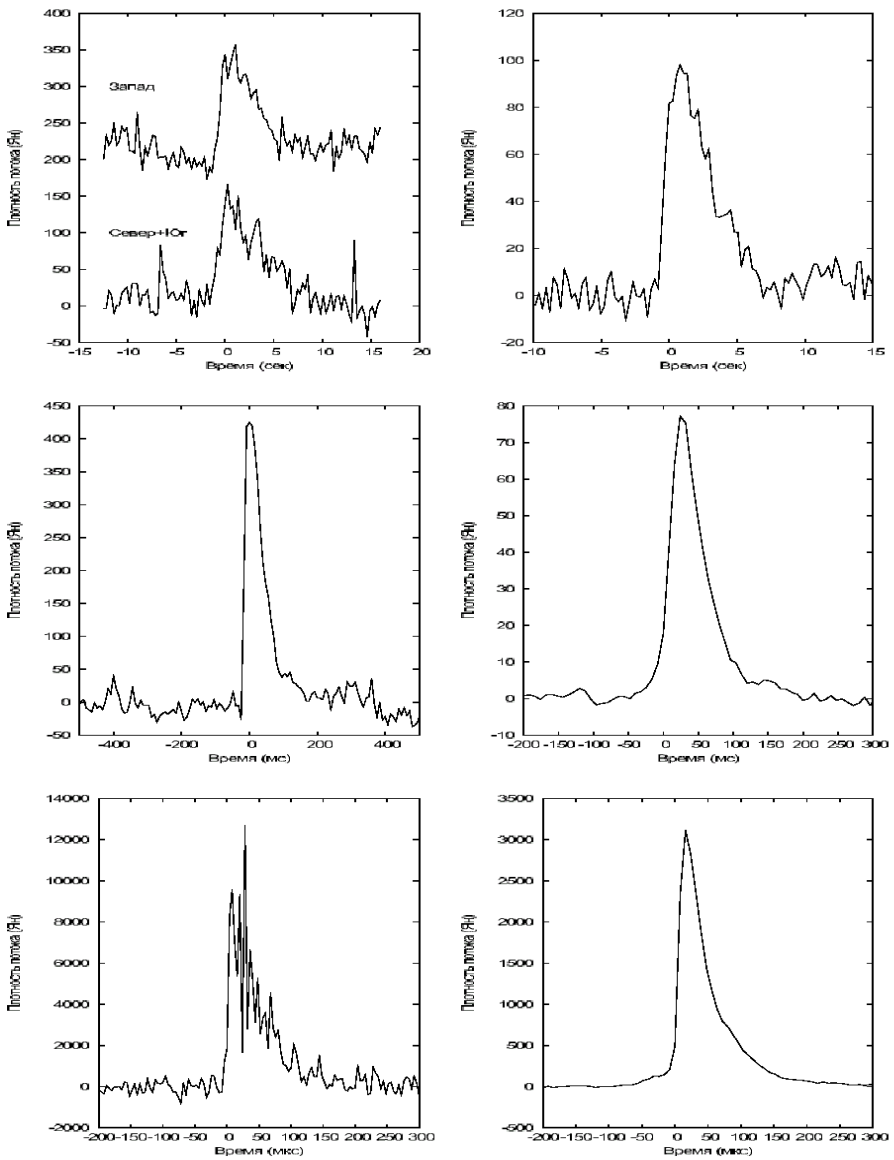
New kinds of Jupiter bursts (September 2016)
Absorption of bursts (top) and bursts with zebra-structure (bottom)
(UTR-2 observation for supporting of Juno Space Mission)



Dynamic spectra of PSR B1133+16 pulses
Observation at UTR-2 RT (Ukraine)

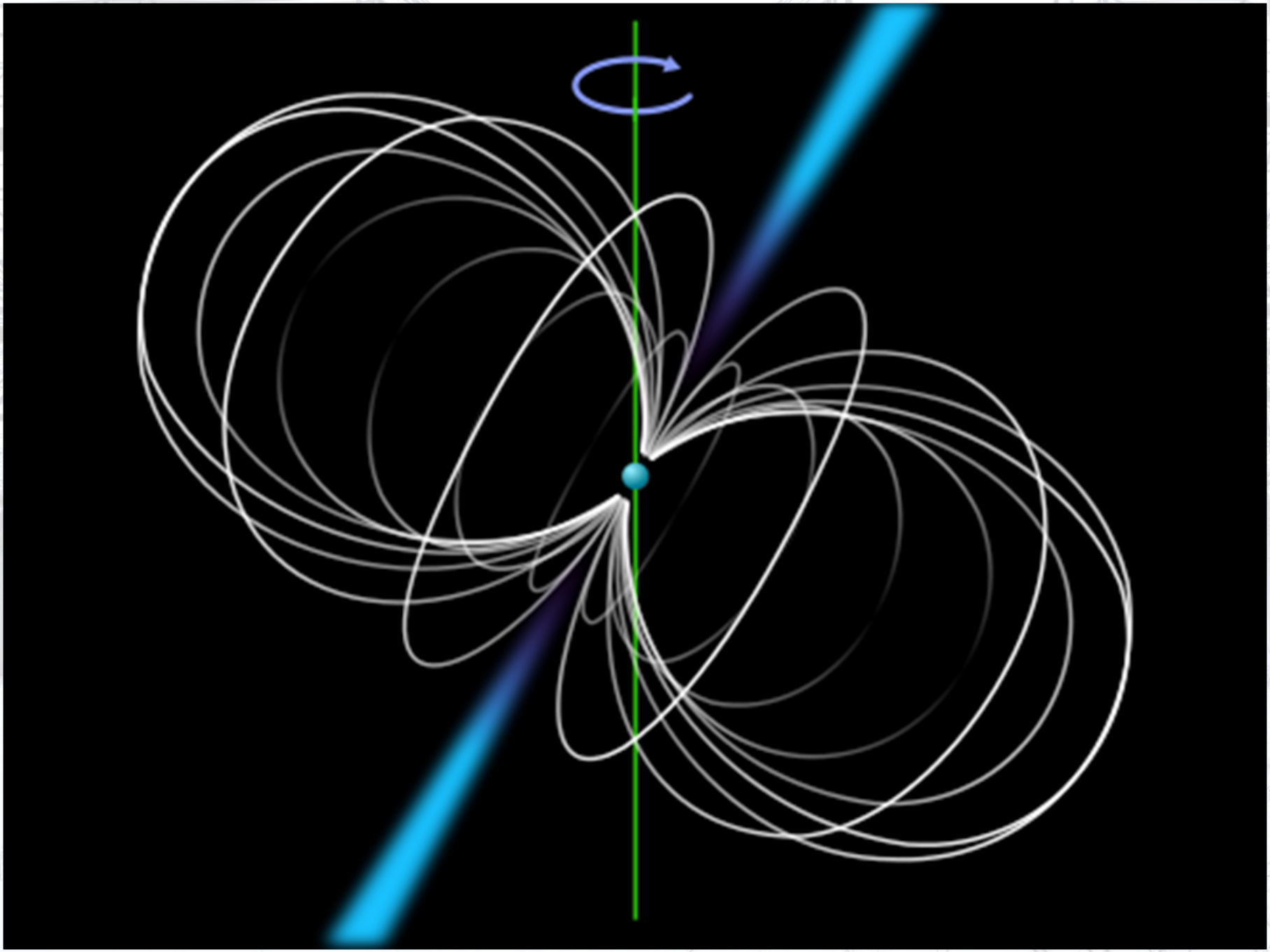


Giant Pulses Profiles at Frequencies: 24, 112 & 600 MHz

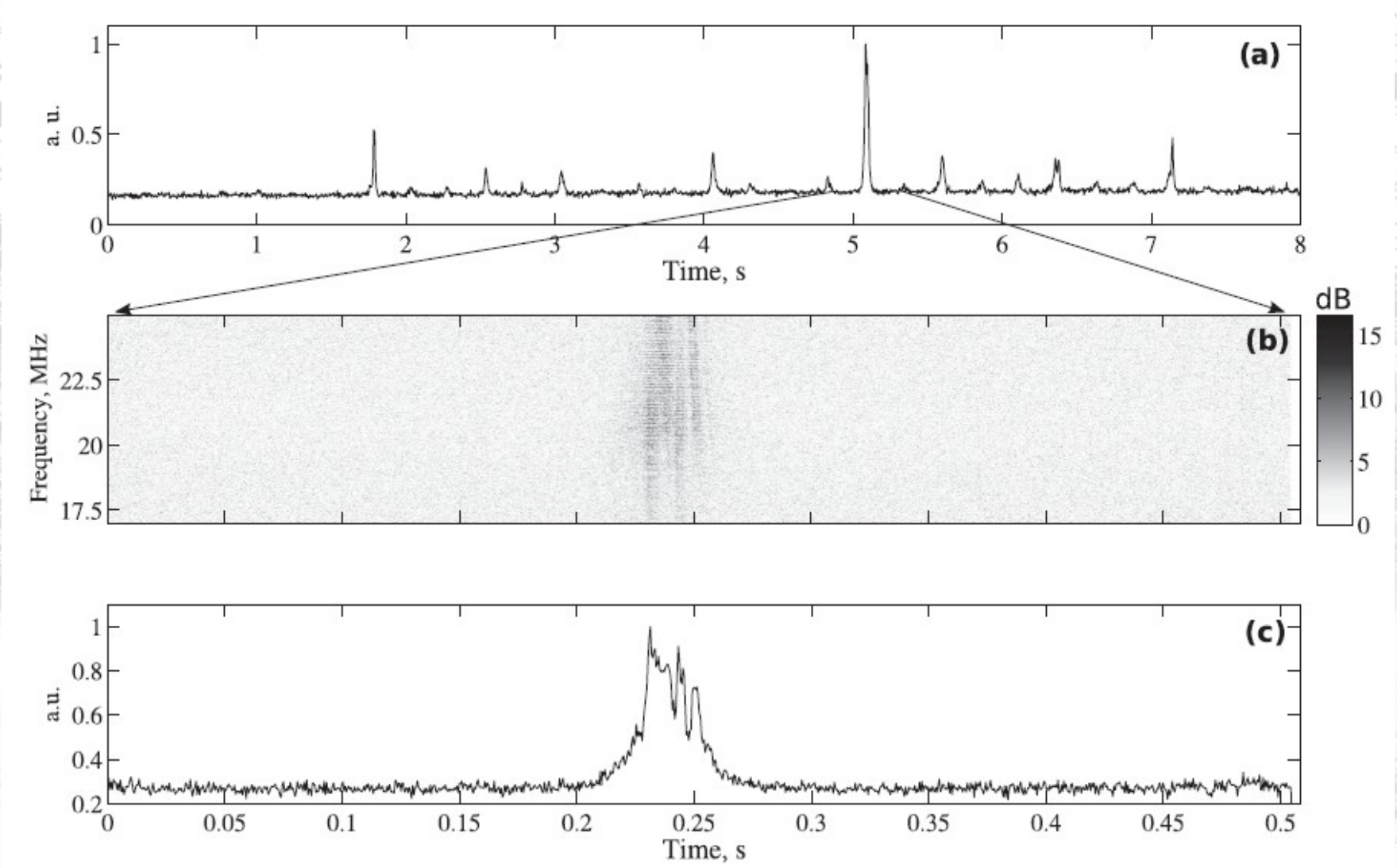


M. V. Popov, A. D. Kuzmin, O. M. Ul'yanov, A. A. Deshpande, et al.
Astronomy Reports, vol. 50, Issue 7, p.562-568
[ASC FIAN (Russia), IRA (Ukraine), RRI (India)]

Model of Pulsar Magnetosphere

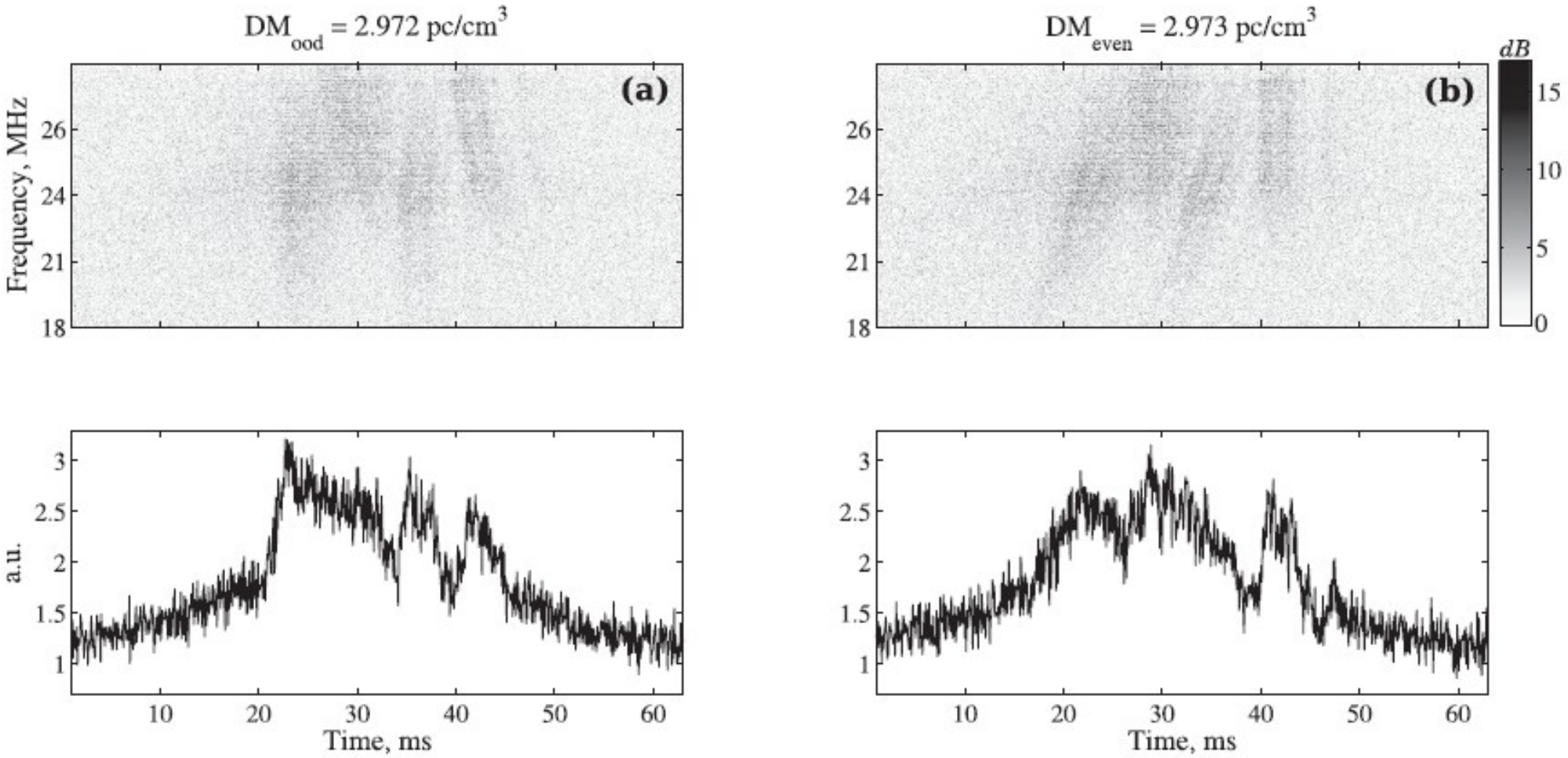


The sequence of the PSR J0953+0755 AIPs;
Dynamic spectrum of the most strong AIP (time resolution 62 μs);
Temporal profile of the most strong AIP.



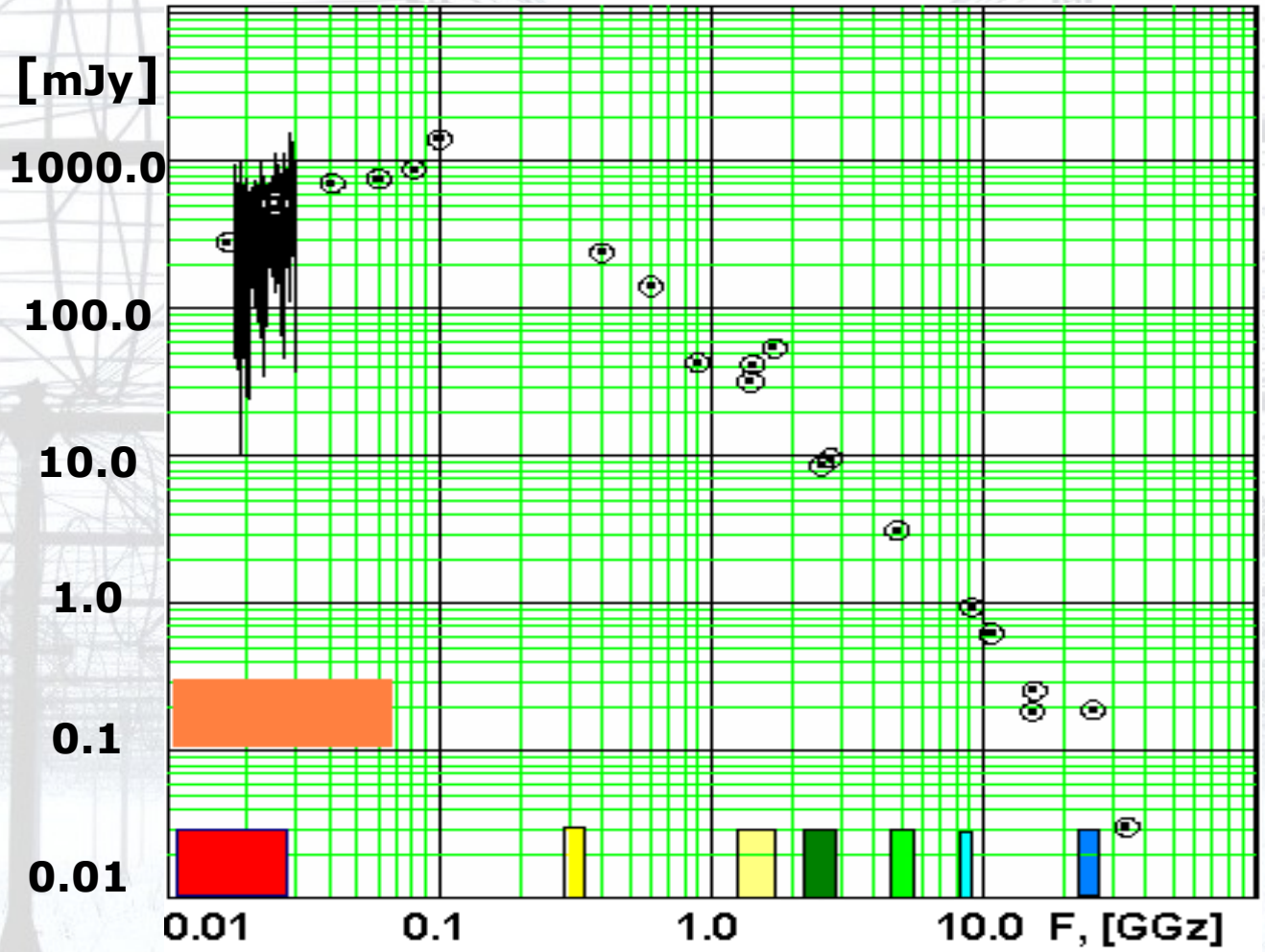
O. M. Ulyanov,‹ A. O. Skoryk,‹ A. I. Shevtsova, et al. Detection of the fine structure of the pulsar J0953+0755 radio emission in the decametre wave range // MNRAS 455, 150–157 (2015)

The dynamic spectra and temporal profiles of the AIP of PSR J0953+0755 for (a) DM_{odd} = 2.9720 pc·cm^{-3} ; (b) DM_{even} = 2.9730 pc·cm^{-3}.



O. M. Ulyanov, A. O. Skoryk, A. I. Shevtsova, et al. Detection of the fine structure of the pulsar J0953+0755 radio emission in the decametre wave range // MNRAS 455, 150–157 (2015)

The plane of expansion IRA NASU in to different range of Radio Spectra



УТР-2
Новая решетка
РТ-70

UTR-2; URAN 1-4;
GURT;

RT-70 (Evpatoria, Crimea, Ukraine);
RT-32 (Lviv, West part of Ukraine)

RT -70 (Crimea peninsula, Evpatoria, Ukraine)

RT-32 dish is situated in the Lviv's region (west part of Ukraine)


ДЯКУЮ ЗА УВАГУ !
THANK YOU !