Low-frequency radio observations at Lustbühel Observatory

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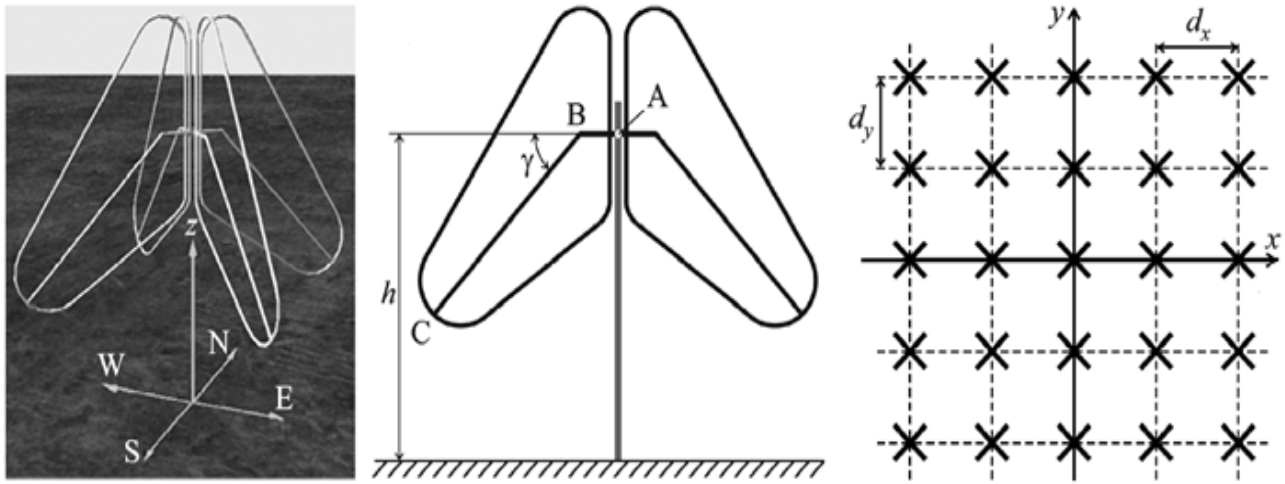
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Lustbühel Radio station

- Lustbühel Radio station consists of two log periodic Yagi antennas with a baseline distance of 80 m in east-west direction.
- The station observed Jupiter using 50 frequency channels receiver enabled simultaneous measurement with a bandwidth of 1 MHz.
- Since 1989 no significant antenna upgrades of the Lustbühel Jupiter radio station has been performed.



GURT sub array



- Sub-array consists of 25 active dipoles (5×5).
- Each antenna element consists of two crossed dipole antenna providing polarization capability.
- The distance between the dipole antenna elements is 3.75 m, and the height is 1.6 m. Therefore one sub-array can be constructed on an area of 225 m² (15 x 15 m)



Installation of GURT elements

Antenna type	Phased array
Num. of antennas	25 dipoles
Frequency range	8 - 80 MHz
Effective area	350 m^2 (40 MHz)
Sensitivity	down to 1 Jy for 10^4 s integr. time
Dynamic range	90 dB
Inst. bandwidth	72 MHz
Number of freq. channels	4 x 14754
Freq. resolution	4.88 kHz
Time resolution	down to 183.5 ns
Polarization	All Stokes parameters

- Telescope can be operated remotely or work in autonomous mode.

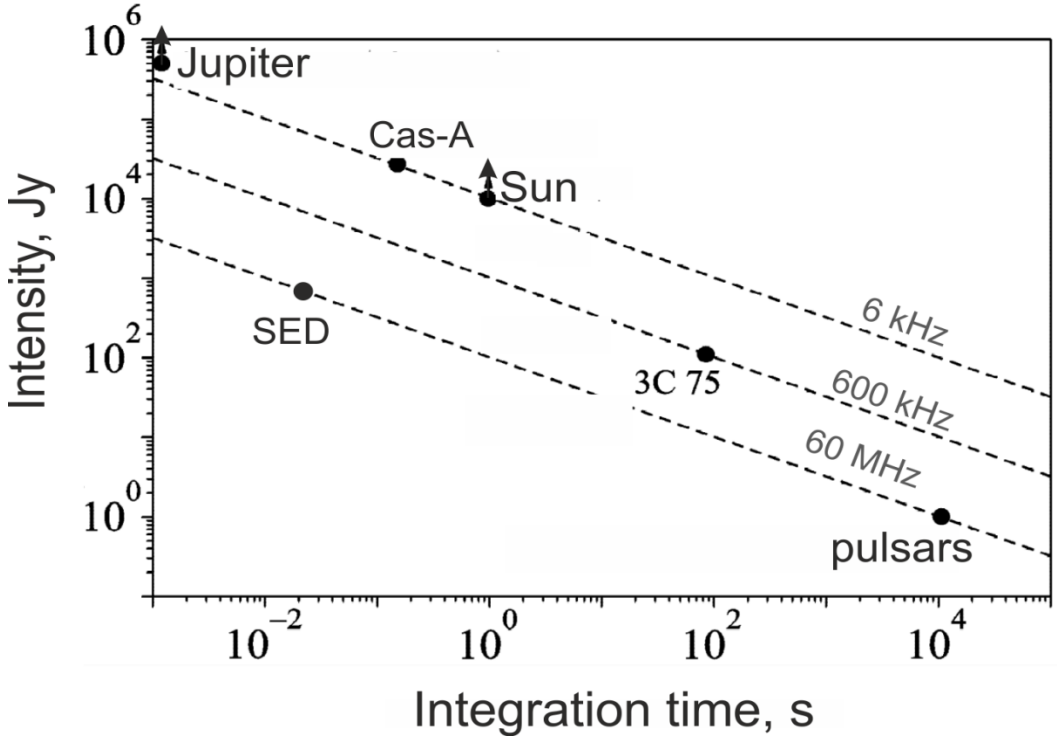
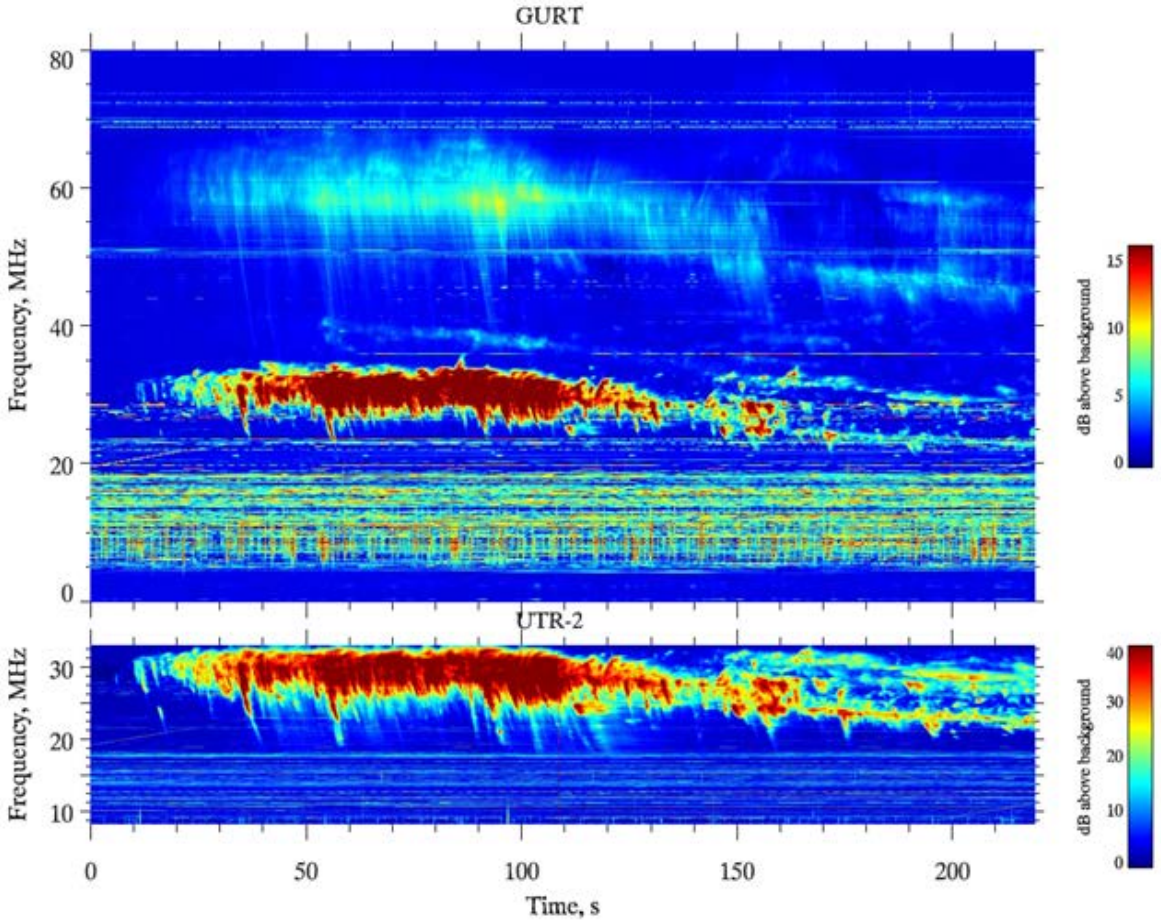


Fig. 3. Sensitivity of one GURT sub-array depending on integration frequency band (dashed lines) and integration time. (SED- Saturn Electrostatic Discharges, 3C75 is a binary black hole system in the Abell 400 cluster of galaxies, Cas-A - Cassiopeia A the brightest extrasolar radio source in the sky.

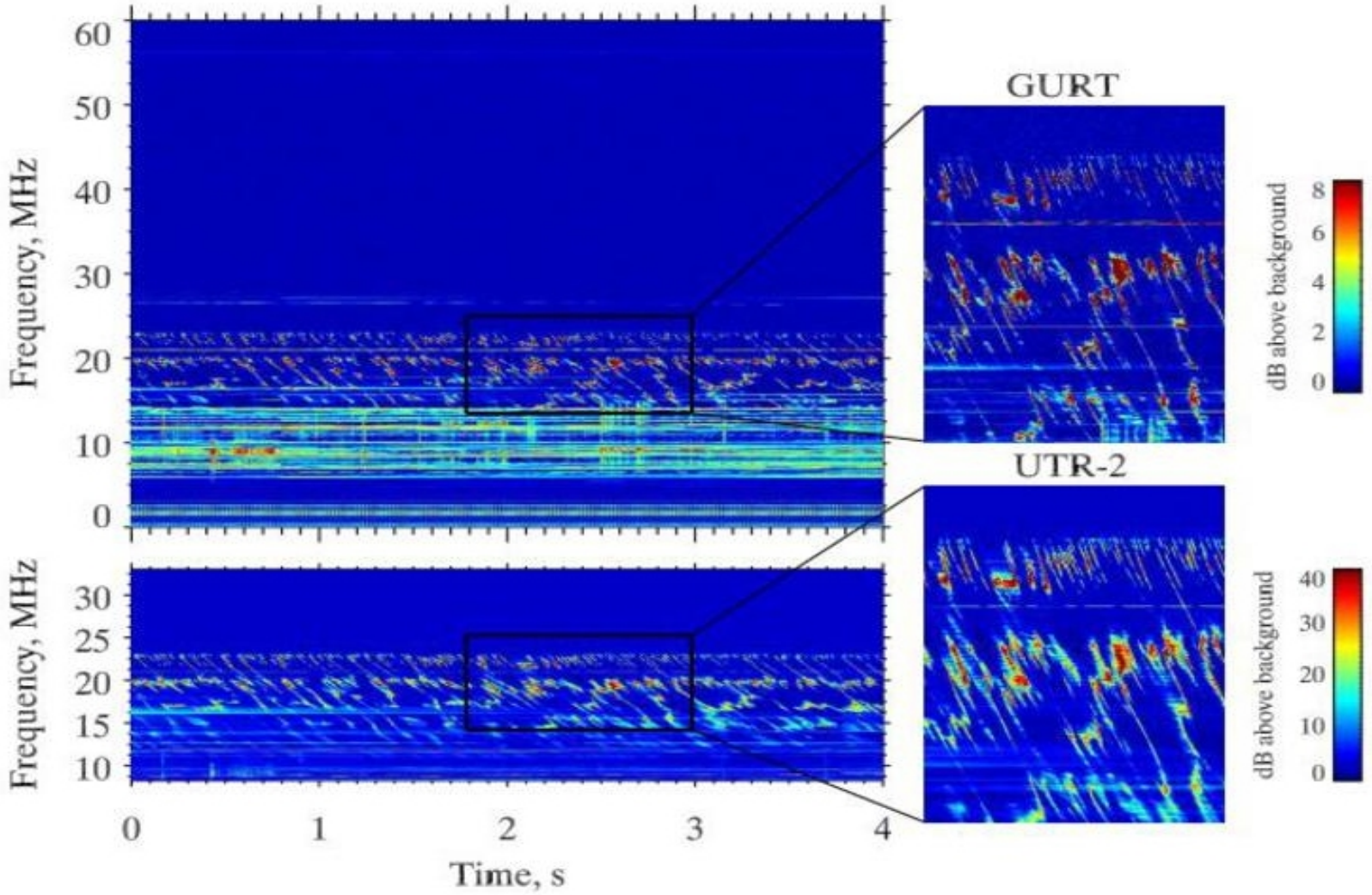
SCIENTIFIC OBJECTIVES

One sub-array of GURT has high sensitivity for brightness temperature which allows to observe:

- Regular observation of the solar radio emission and sporadic solar bursts;
- Jovian radio emission;
- Pulsars at decametric frequencies;
- ionospheric and interplanetary scintillations;
- galactic non-thermal background;
- recombination lines and cosmological effects;



Simultaneous observations of solar type II radio bursts with one GURT sub-array (top panel) and UTR-2 (bottom panel) on July 24, 2014



Jupiter observations (Io-B source) with GURT (upper panels) and UTR-2 (lower panels). The panels show 4 seconds of the recording on 22 February 2015, starting from 20:00:21 UT. The right subpanels are zoomed fragments (1.2 s duration in a 14 – 25 MHz band) of the images located to the left