

Microwave observations of coronal jets

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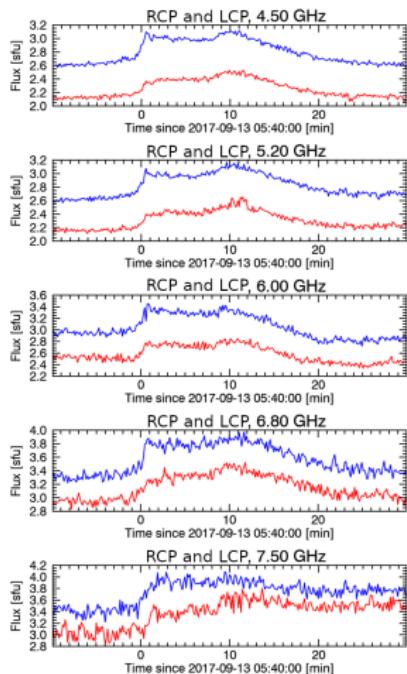
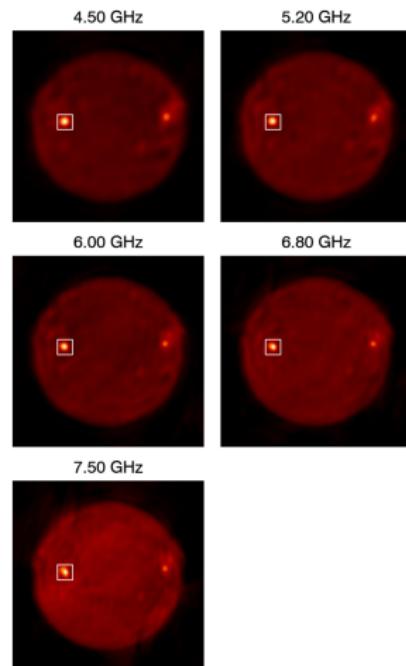
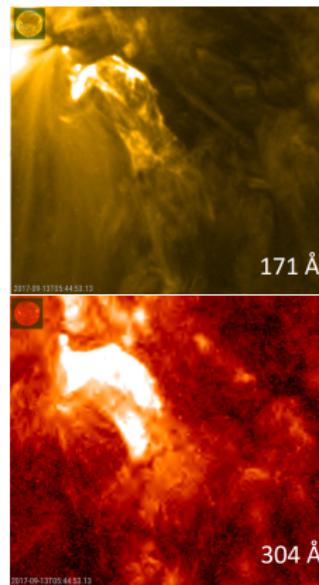
Microwave manifestations of coronal jets

- Thermal emission from jet material
- Non-thermal emission associated with the initiation of a jet
- Negative radio-bursts¹ (absorption of radio emission by cold material of an erupted filament or jet)

¹Kuzmenko (2020)

Observation of a coronal jet by SRH-48²

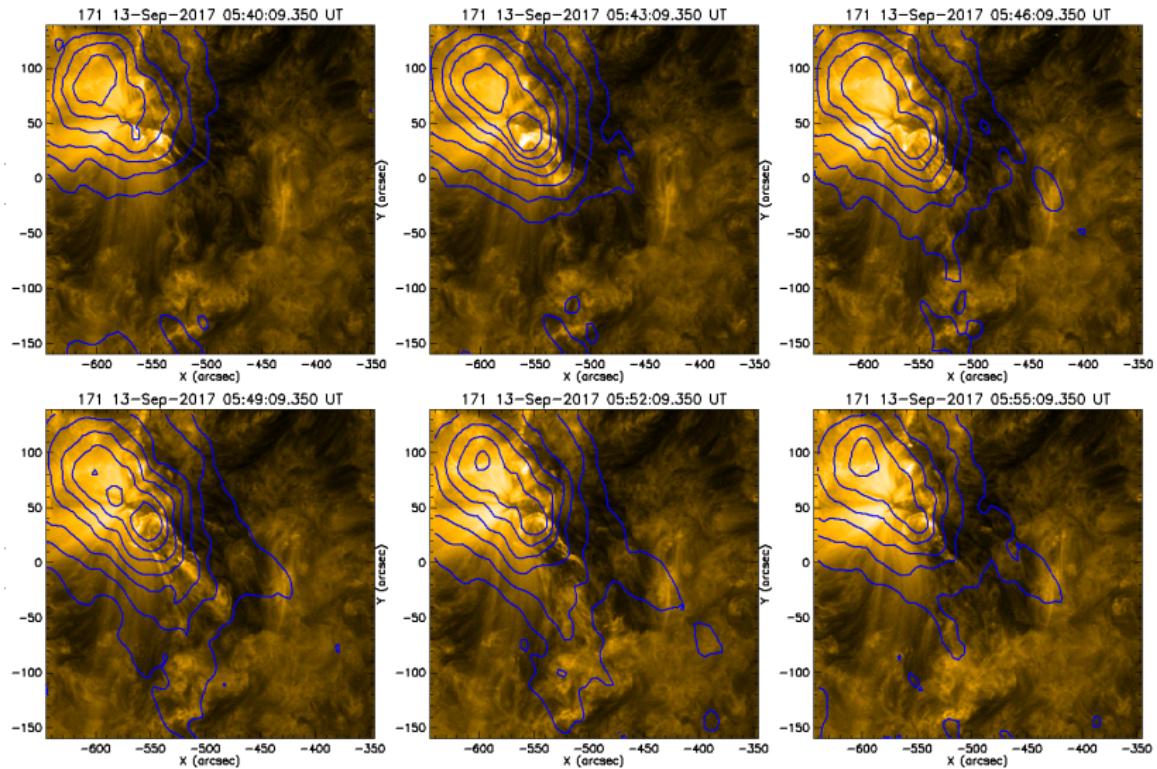
2017-09-13³



248-antenna prototype of Siberian Radioheliograph
³Anfinogentov et al. (2021)

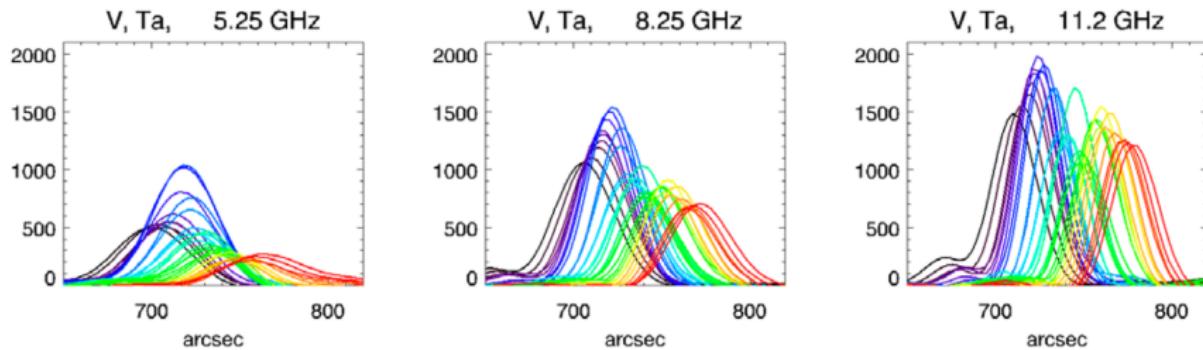
Observation of a coronal jet by NoRH

2017-09-13



Observation of a coronal jet by RATAN-600

2017-09-13



RATAN-600 scans of antenna temperatures of polarized radiation in AR 12738 on April 17, 2019 at frequencies of 5.25, 8.25, and 11.20 GHz. Different colors indicate observations in different azimuths: 31 records with a time step of 8 min. Jet passage time corresponds to a radiation increase in blue scans.

Siberian Radioheliograph 3-6 GHz array

- 128 antenna,
- 6 channels in the 3–6 GHz (can be tuned to an arbitrary number of channels),
- 200 ms to capture one image (RCP and LCP) (1.2 s. for 6 frequencies),
- spatial resolution $\sim 20''$,
- Regular observations in testing mode since January 2016

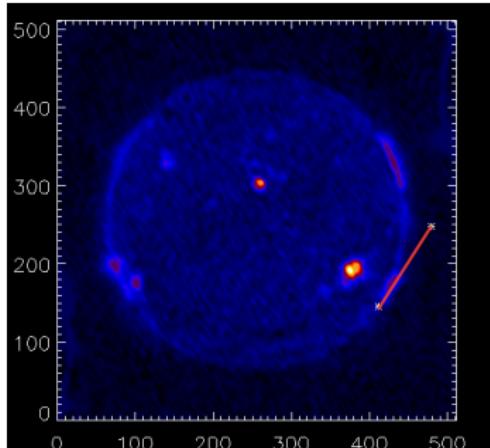


Spatially resolved observation of a jet

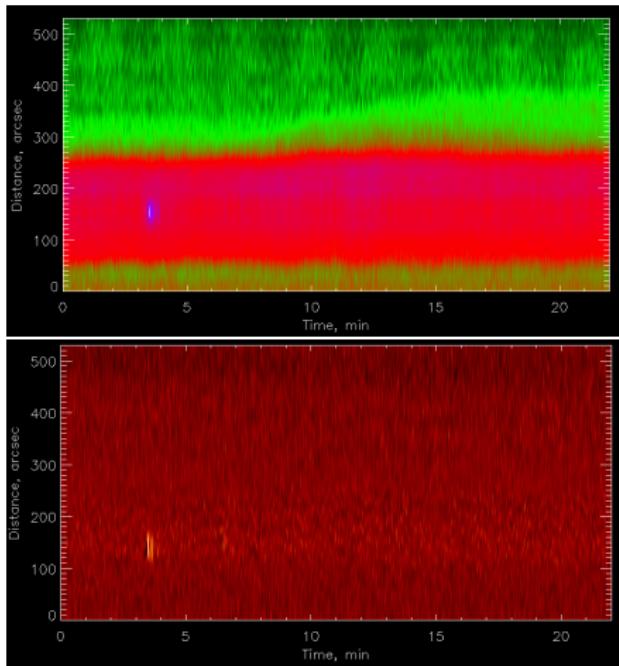
2021-06-10, SRH 2.8 GHz

Spatially resolved observation of a jet

2021-06-10, SRH 2.8 GHz



Projected speed
~ 120 km/s



Conclusions

- We found microwave manifestations of coronal jets observed by NoRH, SRH and RATAN-600
 - ▶ Polarised radio-bursts associated with jet excitations
 - ▶ Radio brightenings associated with a jet body
- Open question:
 - ▶ Why some large and bright (in EUV) jets are not visible in microwave range?

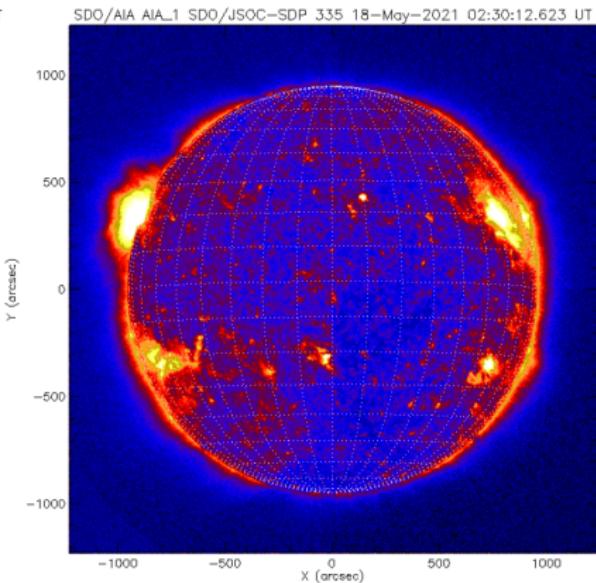
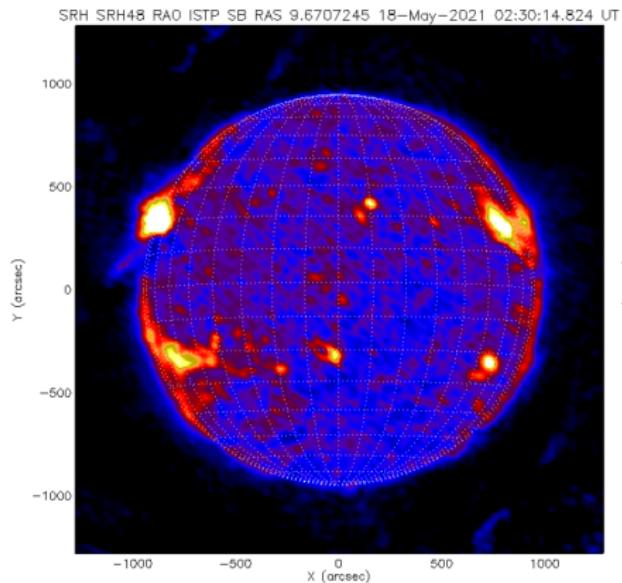
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Thank you for your
attention!

References

- Anfinogentov, S., Kaltman, T., Stupishin, A., Nakariakov, V., and Lukitcheva, M. (2021). Diagnostics of plasma jets in the solar corona. *Solar-Terrestrial Physics*, 7(2):3–10.
- Kuzmenko, I. (2020). Coronal Jets as a Cause of Microwave Negative Bursts. *Solar-Terrestrial Physics*, 6(3):23–28.

SRH, 3.5 GHz vs SDO 335 Å⁴



⁴Figure is prepared by Robert Sych

Access to SRH data

- Realtime images and correlation curves
<https://badary.iszf.irk.ru/>
- Raw data archive <ftp://ftp.rao.istp.ac.ru/SRH/SRH0306>
- Software for image synthesis (in development)
https://git.iszf.irk.ru/anfinogentov/srh48_api