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Publication date

2021

Document Version

Final published version

Published in

The astronomer's telegram

License

Unspecified

[Link to publication](#)

Citation for published version (APA):

Kirsten, F., Ould-Boukattine, O. S., Nimmo, K., Hessels, J. W. T., Yang, J., Gawronski, M., Snelders, M. P., Feiler, R., Marcote, B., & Forssen, O. (2021). Two bright bursts from FRB 20201124A with the Onsala 25-m telescope at 1.4 GHz, with no simultaneous emission detected at 330 MHz with Westerbork 25-m. *The astronomer's telegram*, 14605. <https://www.astronomerstelegram.org/?read=14605>

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Two bright bursts from FRB 20201124A with the Onsala 25-m telescope at 1.4 GHz, with no simultaneous emission detected at 330 MHz with Westerbork 25-m

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on 6 May 2021; 09:47 UT

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Subjects: Radio, Fast Radio Burst

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We are running a multi-telescope, multi-band observing campaign on the recently announced fast radio burst source FRB 20201124A (ATel #[14497](#)). The participating stations are the 25-m telescope at Onsala Space Observatory (OSO, observing between 1360-1488 MHz), the 25-m dish at Westerbork RT1 (300-364 MHz) and the 32-m telescope in Torun (4550-4806 MHz). Whenever possible, the three stations observe simultaneously, recording raw voltages ('baseband' data, dual circular polarisation, 2-bit quantisation) in VDIF format with the local DBBC2 backends.

The baseband data are transferred to a multi-core computer at OSO and searched with a pipeline that converts the voltages to Stokes *I* and writes them out as filterbank files. Depending on observing frequency, the time and frequency resolution vary between 64 microseconds to 1 millisecond and 7.8 kHz and 1 MHz, respectively. We search the filterbank data for bursts using Heimdall and process all candidates with the machine learning classifier FETCH (Agarwal et al. 2020). A detailed description of the pipeline can be found in Kirsten et al. (2021).

Our pipeline detected two bursts in the data taken with the Onsala 25-m dish on 2021 April 22 and 2021 April 25. The bursts' barycentric arrival times (in TDB timescale) referenced to infinite frequency using a dispersion measure of DM = 410 pc cm⁻³ (determined by eye) are:

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B1: MJD 59326.642775112

B2: MJD 59329.517962359

Burst B1 is a single-component burst, while B2 is composed of at least three separate peaks (above we quote the arrival time as the peak of the first component). The three peaks are separated by roughly 9 and 11 ms from one another. We measure the fluences of the bursts as follows:

B1: 20 +/- 2 Jy ms

B2_total: 74 +/- 8 Jy ms

B2_comp1: 26 +/- 3 Jy ms

B2_comp2: 21 +/- 2 Jy ms

B2_comp3: 18 +/- 2 Jy ms

The Westerbork 25-m RT1 telescope was observing at the same time. However, no bursts were found either in a blind search of the whole data set, or at the expected arrival times of the 1.4-GHz bursts when accounting for dispersive delay down to 330 MHz. Thus, we constrain the fluence of any potential counterpart around 330 MHz to be < 80 Jy ms.

[Dedispersed plots of the bursts.](#)

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