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The high-energy burst distribution of a hyper-active repeating fast radio burst source

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Fast radio bursts (FRBs) are enigmatic millisecond-duration radio flashes with an extragalactic origin. FRBs sources can be divided into two populations: repeating and apparently non-repeating sources. The burst energy distribution from repeating FRB sources is an important diagnostic tool that can be used to better understand the emission process, cosmological applications, and the potential link between repeaters and apparent non-repeaters. The study of this distribution is limited both by the sensitivity of telescopes and on-sky time. The brightest FRBs are the most rare; on-sky time is therefore essential in order to probe the high-energy tail. FRB 20220912A is a newly discovered, hyper-active repeating FRB source, first detected by CHIME/FRB in late 2022. Since its discovery we have observed FRB 20220912A for more than 2200 hours over the span of 5 months using the 25-m class radio telescopes in Westerbork, Stockert and Toruń. Our unique, high-cadence observing campaign yielded the detection of more than 150 high-fluence bursts (>10 Jy ms). We have detected bursts at both 300 MHz and 1.4 GHz, but not simultaneously. This newly observed sample of high-fluence bursts from FRB 20220912A allows us to compare it to the high-energy distribution from our previous high-cadence campaign towards FRB 20201124A, another highly active source. In this presentation, I will discuss the maximum burst energies that FRBs can reach, as well as the potential links between repeaters and apparent non-repeaters.

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