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Probing the highest-energy FRB repeater bursts using thousands of hour observing campaigns

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The burst energy distributions of repeating fast radio burst (FRB) sources are an important diagnostic of the emission process. To date, burst energy distributions have only been studied for a few active repeaters, and are limited both by telescope sensitivity (for the weakest and most common bursts) and on-sky time (for the brightest and rarest bursts). Though there is evidence for a characteristic lowest energy scale in the case of FRB 20121102A, the upper-limit to the burst energies of repeaters is poorly constrained. FRB 20201124A is one of the most active repeaters known, and it produces bursts that are easily detectable even with a modest 25-m radio telescope. We observed FRB 20201124A for more than 3500 hours over the last year, using multiple European radio dishes in Onsala, Stockert, Torun and Westerbork. We detected more than 50 high-fluence bursts (>10 Jy ms). All these bursts were detected at 1.4 GHz and showed no counterpart in simultaneously recorded 350-MHz or 5-GHz observations (in the cases when multi-frequency coverage was available). Our sample of detected bursts consists of some the brightest FRBs ever observed, with fluences ˜1 kJy ms. I will present this sample and show how it constrains the high-energy burst distribution of this source.

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