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Abstract:

Repeating and one-off FRBs may have different physical origins, i.e., it is expected that repeaters originate from repeating mechanisms such as pulsars and magnetars. In contrast, one-off FRBs are likely related to catastrophic events such as supernova explosions. Because these are completely different physics, clearly separating repeating and one-off FRBs is fundamental to understanding the as-yet-unknown origins of FRBs. However, this simple classification has been notoriously difficult because one-time detection of an FRB means neither (i) it will not repeat in the future nor (ii) it was not detected to repeat during the observation. As such, the current sample of one-off FRBs is most likely contaminated by repeating FRBs. In Hashimoto et al. (2020) and Chen et al. (2022), we proposed new classification schemes using energy and duration of FRBs and machine learning without time-consuming monitoring observations. Taking advantage of the superb sensitivity of the FAST telescope, we propose to test our classification by monitoring 41 one-off FRBs that are classified as repeaters with our methods. Once proven correct, our methods would be extremely useful in classifying and interpreting thousands of FRBs in the era of the flood of FRB detections by CHIME and SKA.