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Investigating the FRB-magnetar connection in nearby galaxies with the Northern Cross Radio Telescope

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Fast radio bursts (FRBs) are intense, millisecond-long radio signals of unknown extragalactic origin. The detection of the very first galactic FRB-like signal from the magnetar SGR J1935+2154 has strengthened the connection between FRBs and magnetars. Using the Northern Cross radio telescope, we conducted a targeted search for FRBs in a sample of seven nearby galaxies, with a total observation time of ~ 700 hours. Our observational campaign yielded one FRB detection in the direction of the galaxy M101, observed with a $DM = 302.9 \text{ pc cm}^{-3}$, which supports the idea that it originated from a much distant source. From our nondetections on the galaxies we observed we can place an upper limit of 0.4 yr^{-1} on the rate of FRBs from magnetars like SGR J1935+2154, which disfavors them as the sole progenitors of cosmological FRBs, supporting the evidence for at least another, more exotic population of magnetars, not born via core-collapsed supernovae.

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