Paper ID: 69772
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51st IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The Next Steps (A4)
SETI 1: SETI Science and Technology (1)

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AN INVESTIGATION OF FAST RADIO BURSTS AND ITS FEASIBILITY AS TECHNOSIGNATURE

Abstract

Fast radio bursts are astrophysical radio pulses which occur for a fraction of a millisecond to a few milliseconds. They appear sporadically and although clustered, the frequency is irregular. The first FRB was discovered in 2007. Data reports observations of 16.35 ± 0.15 day periodicity of one of the FRBs. All the FRBs have shown varied characteristics in terms of their periodicity, occurrence, and energy profile. However, the origins and emission mechanism of FRBs are still unknown. Given the unusually high intensity of detected radiation for its expected distance from Earth, there arise various possible theories to explain FRB emissions. Several researches are being conducted to deduce the theory. Some of the possible astrophysical candidates for FRBs include magnetars which are highly magnetized young neutron stars. Some models suggest that FRBs are extragalactic magnetars produced as a result of the high magnetic fields. The first FRB counterpart was detected in 2016, FRB 150418, followed by FRB 131104 and FRB 12110 Another set of findings suggests that repeating FRB pulses might originate from the starquakes of a pulsar. Apart from astrophysical origins, some theories also examine the possibility that FRBs might not be any natural phenomena at all. Thus, claiming that they are signs from extragalactic civilisations demonstrating a possibility of FRB becoming a technosignature. Literature suggests that some FRBs are known to be repeaters like FRB180916, while others might be of different origins. In this paper, we aim to explain the possible origins of FRBs by studying the energy signature and responsible magnetic field strength for repeater and non-repeater FRBs in the wake of newer discoveries made in the galactic plane. We have also investigated the possibility of them originating due to intelligent life existing in a planetary system. Our study is to attribute an origin to FRB population and test the hypothesis of them being radio technosignatures.