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The Physical Mechanisms of Fast Radio Bursts

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Fast radio bursts (FRBs) are cosmological millisecond-duration bursts in the radio band. The recent detection of the Galactic FRB 200428 suggests that magnetars can produce FRBs. In this talk, I will review the current understanding of the physical mechanisms of FRBs in reference of two related astrophysical phenomena, namely, radio pulsars and gamma-ray bursts. I will discuss the observational evidence in favor of FRB emission involving a neutron star magnetosphere. Some ideas and issues of various radiation mechanisms for FRBs and the associated X-ray bursts within the magnetar framework will be critically discussed. Several open questions in the field regarding repeaters vs. non-repeaters and whether there are engines other than magnetars will be presented.

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