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Constraints on Central Engine of Merger-region Gamma-ray bursts

The nature of the remnant formed by the coalescence of two neutron stars (NS), is highly sensitive to both the initial mass and the equation of state of the progenitors. Traditionally, accreting black holes formed in the aftermath of NS mergers have been the prevailing central engine model to power short duration gamma-ray bursts (GRBs). However, this framework fails to explain the long-lasting high-energy emission observed in events, such as GRB 211211A and GRB 230307, also accompanied by a candidate kilonova. Their long-lived gamma-ray emission could be explained by considering magnetized NSs as the remnants of such mergers. Late-time radio observations offer an alternative observational window to analyse the GRB central engine. In this presentation, I will discuss how radio studies allow us to discriminate between GRB engine models. This approach enables us to set stringent upper limits on the environment density and ejecta dynamics of this emergent class of transients.

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