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Probing electromagnetic-gravitational wave emission coincidence in type I binary-driven hypernova family of long GRBs at very-high redshift (online talk)

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Due to the technical time delay of the XRT instrument on board the Neil Gehrels Swift Observatory satellite, we cannot observe the X-ray emission occurring less than ~40 s after a gamma-ray burst (GRB) trigger time. We here indicate a new strategy of using the cosmological time dilatation in high redshift GRBs to observe the earliest X-ray emission by Swift/XRT in the GRB cosmological rest-frame. We illustrate this procedure using 354 GRBs with a well-defined cosmological redshift selected from the Swift GRB catalog. We compare and contrast the time delay between the trigger of the source and the first observation by Swift/XRT as measured in the observer frame (OTD) and the corresponding delay measured in GRBs' cosmological rest-frame (RTD). We consider as specific prototypes three binary-driven hypernovae of type I (BdHNe I): GRB 090423 at z=8.2 with an RTD of 8.2 s, GRB 090429B at z~9.4 with an RTD of 10.1 s, as well as the GRB 220101A at z=4.6 with an RTD of 14.2 s. This opens a new possibility for probing Episode (1) of BdHNe, linked to the origin and early appearance of the newborn neutron star (νNS) and its transition from a Jacobi triaxial ellipsoid (JTE) to a Maclaurin spheroid configuration that originates the GRB afterglow onset. We also present the methodology to compute the sweeping frequencies and the energetics of the associated conspicuous gravitational wave emission.

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