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Gaining understanding of gravitational wave emission in the earliest phases of long GRBs: sweeping frequencies and energetics (online talk)

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Due to the technical time delay, greater than ~ 40 s, of the XRT instrument on board the Neil Gehrels Swift Observatory satellite, we are not able to observe the x-ray emission occurring less than ~ 40 s after a gamma-ray burst (GRB) trigger time. A new strategy is indicated here of using the cosmological dilatation of time in the observer rest frame measured in high redshift GRBs to observe in the GRB cosmological rest-frame their earliest X-ray emission by Swift/XRT even less than 10 s after the trigger. We illustrate this procedure using 353 GRBs with well-defined cosmological redshift, based on the \textit{NASA-Swift GRB Table}. 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 GRB 090423 at $z = 8.2$ with an RTD of 8.2~s, GRB 090429B at $z \sim 9.4$ 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 the first episode of the binary-driven hypernova (BdHN) model linked to the origin and early appearance of the newborn neutron star (νNS) and the first clear manifestation of a transition from a Jacobi to a Maclaurin sequence prior to the onset of the GRB afterglow.

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