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TeV Emission from GRB Afterglows - Theory

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GRBs'progenitors are also sources of gravitational waves. Binary neutron star mergers that are progenitors of short GRBs are the classical sources of chirping GW signals. Long GRBs arise from Collapsars. While GWs haven't been observed yet from collapsing stars, a non-spherical collapse would be a source of a burst of GWs. In addition, both long and short GRBs involve the acceleration of relativistic jets. The acceleration of these jets is an additional source of memory type gravitational waves - Jet-GWs. The characteristic frequency depends on the acceleration mechanism and the duration of the jet, while the amplitude depends on the jet' s energy and its distance. Detection of Jet-GWs would reveal information on GRBs'central engines and the jet acceleration mechanic that cannot be observed otherwise. While typical GRBs are too far for detection of their Jet-GWs in the near future, detection of Jet-GWs from hidden jets taking place within regular SNe is likely with next generation detectors. Detection of a jet within a galactic SGR giant-flare would be possible even with LIGO and Virgo.

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