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Resonant Shattering Flares as Multimessenger Probes of Neutron Star Physics (Invited)

Friday, 3 April 2020 10:00 (30 minutes)

Resonant Shattering Flares (RSFs) are expected to occur during the inspiral phase for some NS-NS and NS-BH mergers. They result from the resonant tidal excitation of the NS crust-coreinterface mode fracturing the crust and sparking a relativistic pair-photon fireball, emitted seconds before the merger.

RSFs are prompt, bright, and isotropic, allowing potential detection and triggering from well beyond the LIGO-horizon and may be an important source for detectable electromagnetic counterparts to GW mergers. When a GRB is present, they appear as pre-cursors to the main flare, while for off-axis systems they should appear as isolated under-luminous GRBs with extremely short duration. RSFs will depend on the age and magnetic evolution of neutron stars, as they require sufficient surface magnetic field to mediate the energy release.

I will discuss the physics and detectable emissions for RSFs compared to other counterparts, in NS/NS and NS/BH mergers, as well as estimates of the number of expected RSFs compared to possible orphan events.

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