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Electromagnetic precursor flares from neutron star mergers ELIAS MOST, Princeton University, ALEXANDER PHILIPPOV, Center for Computational Astrophysics, Flatiron Institute — Gravitational wave events of merging neutron stars are exciting laboratories for multi-messenger astronomy, featuring gravitational wave emission as well as electromagnetic counterparts. Apart from the afterglow and short gamma-ray burst observed for GW170817, there is another potential electromagnetic counterpart that has not yet been detected. Because neutron stars are equipped with strong magnetic fields, the non-trivial interaction of two neutron star magnetospheres before the merger might give rise to an electromagnetic precursor emission.In this talk, I will present a mechanism for launching powerful electromagnetic flares during the inspiral of two neutron stars. Using special-relativistic force-free electrodynamics simulations, I will demonstrate that differential motion, such as relative spin differences between the neutron stars or misalignment of the magnetic field with the orbital axis, can naturally lead to a periodic emission of such flares. I will also comment on the viability to produce radio emission in this process.

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