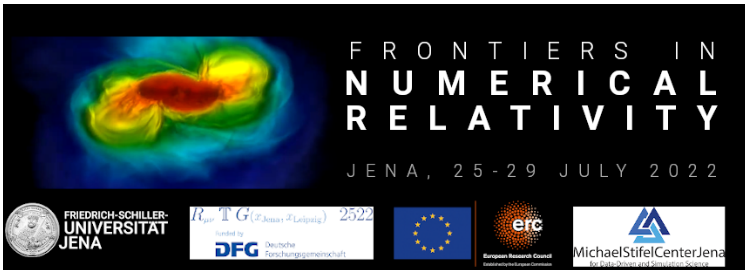

Contribution ID: **15** Type: **not specified**

Universality of the turbulent magnetic field amplification in binary neutron star mergers

Wednesday, 27 July 2022 09:30 (15 minutes)

The detection of a binary neutron star merger in 2017 through both gravitational waves and electromagnetic emission opened a new era of multimessenger astronomy. During the merger, several mechanisms like the Kelvin-Helmholtz instability, the winding up effect and the MRI, can amplify the initial magnetic field in the remnant to be powerful enoguh for launching a jet, with an associated short GRB. When performing simulations, simplified assumptions arise for the initial magnetic field strength and topology of the merging neutron stars. Here I will show convergent results by using high-resolution, large-eddy simulations of binary neutron star mergers, following the newly formed remnant for up to 30 milliseconds. I will specifically compare simulations with different initial magnetic field strenghts and configurations, going beyond the widespread-used aligned dipole confined within each star. I will show that the magnetic field is always amplified up to ~10^16 G in the bulk region of the remnant, while the initial topology is quickly forgotten in a timescale of few miliseconds after the merger due to the Kelvin-Helmholtz instability.

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Session Classification: Short talks