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A multi-dimensional implementation of the Advanced Spectral neutrino Leakage scheme

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Merging neutron stars are both gravitational wave and electromagnetic transient sources, as confirmed by the detection of the GW170817 event. The gravitational wave emission was indeed followed by emission all across the electromagnetic spectrum, including an optical and infrared signal known as macronova. This signal is powered by the radioactive decay of freshly synthesized r-process elements.
The early blue component requires ejecta with electron fractions $Y_e > 0.25$. Such large values in a neutron rich environment like the one coming from a neutron star merger point to a re-processing of a fraction of the ejecta by weak interactions.
In this talk I will present a multi-dimensional implementation of the Advanced Spectral neutrino Leakage applicable to binary neutron star mergers. The main goal is modeling the neutrino absorption in the semi-transparent regime, which can drive winds from the merger and raise the Y_e. This ejection channel is thought to be behind the observed blue macronova component. Preliminary numerical tests of the scheme are presented in the form of snapshot calculations and compared against a two-moment scheme approach.

Keywords

Compact Object Mergers

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