

Core-Collapse SN detections from Einstein Telescope

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Gravitational waves offer a promising opportunity to investigate the explosion mechanism behind CCSNe, as they are expected to originate from the oscillations of the proto-neutron star formed during collapse. The third-generation gravitational wave detector, the Einstein Telescope, with its sensitivity to low-frequency signals, has the potential to detect GW signatures from such events.

In this talk I will present a recent work carried out for the Stellar Collapse and Rotating Neutron Stars Division of the ET collaboration, focused on the expected rate of CCSNe and the detection capabilities of the ET within the Milky Way and Magellanic Clouds. To assess ET capabilities, we employed simulated waveforms from CCSNe and the GWFISH software to produce SNR-weighted density maps and determine the detection horizon for these signals. This information can be crucial for developing synergies with electromagnetic and neutrino observatories, enabling a multi-messenger search for future Galactic supernovae.

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