Contribution ID: **72** Type: **Poster**

Estimating the Detection Horizon for Core-Collapse Supernovae

Core-collapse supernovae (CCSNe) are one of the most anticipated gravitational wave sources in the frequency band of the Einstein Telescope (ET). Detecting such an event can provide crucial information on the processes occurring during the final stages of massive stars and open perspectives in multi-messenger astronomy. Compared to current detectors, which are capable of measuring supernovae within a fraction of our galaxy, the improved sensitivity of ET will significantly increase the observable volume and, therefore, the expected event rate.

This poster presents an estimation of ET's detection horizon using various waveforms from multi-dimensional CCSN simulations and phenomenological models. An upper limit is computed with optimal matched filtering, while a more realistic estimate is obtained with the unmodelled burst search algorithm *Coherent WaveBurst*. Moreover, perspectives for a deep-learning-based approach for CCSN detection are presented.

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Session Classification: Poster Session