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Gravitational wave signatures of magnetic field generation in core collapse supernovae

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After the groundbreaking gravitational wave detections of compact binary mergers, core-collapse supernova explosions of massive stars have come into focus as one of the next big challenges for gravitational wave astronomy. Thanks to increasingly mature simulations, our understanding of the expected time-frequency structure of the core-collapse supernova gravitational wave signal has advanced considerably. In the event of a high signal-to-noise detection, this would allow us to derive quantitative constraints on the proto-neutron star structure, the explosion dynamics, and the rotation of the progenitor core. However, the impact of magnetic fields on the supernova gravitational wave signal has yet to be explored in depth, especially in the light of growing awareness of a more pervasive role of magnetic fields in supernovae than hitherto assumed. I will discuss gravitational wave signatures of magnetic field generation suggested by recent simulations and also comment on broader perspectives for magnetohydrodynamic modelling of core-collapse supernovae.

Primary author: MUELLER, Bernhard (Monash University)

Co-authors: Dr POWELL, Jade (Swinburne University of Technology); Mr JARDINE, Rylan (Monash University)

Presenter: MUELLER, Bernhard (Monash University)

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