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Probing the central engine of core-collapse supernovae through gravitational-wave and neutrino emissions

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Core-collapse supernovae are dramatic explosions marking the catastrophic end of massive stars. Optical outbursts begin only hours after the actual onset of the catastrophe in the very center of the star. There the central iron core collapses to a neutron star thereby liberating the gravitational binding energy which causes the supernova explosion. The only means to get direct information about the supernova “engine” is from observations of neutrinos emitted by the forming neutron star, and through gravitational waves which are produced when the hydrodynamic flow or the neutrino flux is not perfectly symmetric. After reviewing the basic physics of core collapse supernovae, the results of our recent simulations about such aspherical processes and the resulting neutrino and gravitational-wave signals will be discussed.

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Classification de Session: More on the emission processes of GW and HEN