

'Extreme Core-collapse Supernovae in Three Dimensions'

Hyperenergetic and superluminous core-collapse supernovae belong to the most extreme transient events in the universe and are a key factor in the supernova gamma-ray burst connection. In this talk I will present results from high-fidelity three-dimensional magnetohydrodynamics simulations of extreme core-collapse supernovae with an emphasis on the engines driving the explosions and their observational signatures. I will conclude by discussing how magnetic fields and turbulence as the key ingredients in these engines also play a critical role in many other astrophysical systems, for example in modeling the gravitational wave and electromagnetic emission from compact object mergers.

Best,
Philipp