



PHYSIKALISCHES KOLLOQUIUM

des Fachbereichs Physik der Goethe-Universität Frankfurt

Mittwoch, den 22.11.2023, 16 Uhr c.t.

Großer Hörsaal, Raum _0.111, Max-von-Laue-Str. 1



Prof. Dr. H.-Thomas Janka,
Max Planck Institute for Astrophysics, Garching

Core-Collapse Supernovae in 3D: From the Explosion Mechanism to Observational Properties

Core-collapse supernova explosions terminate the lives of massive stars, produce and disseminate a major fraction of the heavy elements, play an important role as neutrino and particle laboratory, and give birth to neutron stars and stellar-mass black holes, which have recently become sources of measured gravitational waves. Self-consistent 3D simulations lend support to the neutrino-driven explosion mechanism for powering the far majority of the core-collapse supernovae. Building up on this paradigm it has been shown that 3D explosion models can explain a large variety of observed properties of these supernovae and their remnants. This fact also permits to deduce new constraints on particle possibilities beyond the standard model of particle physics. However, crucial physics ingredients in the supernova models are still uncertain, for example the nuclear equation of state and the question of neutrino flavor oscillations. Tension between the detected Supernova 1987A neutrino signal and predictions from state-of-the-art models might point to such gaps in our understanding. The talk will provide a survey of these recent developments in supernova theory.

Die Dozenten der Physik

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