

Neutrinos from SN 1987A probing the inner properties of supernova

giovedì 21 dicembre 2023 10:20 (20)

The explosion of SN1987A is the only case in history in which a neutrino signal from a nearby supernova (SN) has been observed, and has shaped our understanding of the inner mechanisms of SNe. In this talk, we revisit the interpretation of SN1987A from a modern perspective. We compare up-to-date SN models with the legacy data, showing a general consistency in the time-integrated properties. The neutrino signal, both in the accretion-dominated and in the cooling-dominated phase, agrees with the observations if the central protoneutron star is light enough, allowing us to infer a range for the initial mass of the remnant. The inclusion of convection and updated neutrino-nucleon opacities in the current models, compared to the historical ones, leads to a shortened duration of the burst, in tension with the observed signal duration. This suggests a second, independent phase of emission to explain the late-time observed events.

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Session Classification : Astro Physics & Particle

Track Classification : Astrophysics & Astroparticle Physics