

7

## Turbulence in Core-Collapse Supernovae

Ernazar Abdikamalov<sup>1</sup><sup>1</sup> *Nazarbayev University***Corresponding Author(s):** ernazar.abdikamalov@nu.edu.kz

Core-collapse supernovae are the powerful explosions of massive stars that occur at the end of their lives. They play a crucial role in the evolution of the Universe, producing most elements heavier than iron and leading to the formation of neutron stars and black holes. Despite their importance, the details of how they explode are still unclear. In this talk, I will review the recent progress in our understanding of the explosion mechanism, with an emphasis on the role of turbulence in facilitating an explosion.

**Type of contribution:**

Invited talk

17

## Impact of the MIT bag model parameters values on the maximum mass of neutron star with a quark core

Grigor Alaverdyan<sup>1</sup> ; Yuri Vartanyan<sup>1</sup><sup>1</sup> *Yerevan State University***Corresponding Author(s):** galaverdyan@ysu.am, yuvartanyan@ysu.am

The effect of model parameters of quark matter equation of state on the magnitude of the maximum mass of a hybrid star is investigated. The quark matter is described within the framework of the extended MIT bag model with one-gluon exchange corrections taken into account. For nucleon matter within the density region, corresponding to a phase transition, the relativistic equation of state is used and calculated with consideration of two-particle correlations, based on the Bonn meson-exchange potential. Using Maxwell's construction, the characteristics of a first-order phase transition are calculated, and it is shown that for a fixed value of the strong interaction constant  $\alpha_s$ , the baryon concentrations of the coexisting phases grow monotonically with increasing bag constant  $B$ . It is shown that for a fixed value of the strong interaction constant  $\alpha_s$ , the maximum mass of a hybrid star increases with decreasing bag constant  $B$ . For a given value of the bag parameter  $B$ , the maximum mass increases with increasing strong interaction constant  $\alpha_s$ . It is shown that the hybrid star configurations, with maximal mass equal to or exceeding the mass of the currently known most massive pulsar, are possible for the values of the strong interaction constant  $\alpha_s > 0.6$ , also for sufficiently small values of the bag constant  $B$ .

**Type of contribution:**

Talk

32

## Supporting the existence of the QCD critical point by compact star observations

David Edwin Alvarez Castillo<sup>1</sup>