

# Frontiers in Gamma Ray Spectroscopy

## FIG18

Contribution ID : 31



## Study of some physical aspects of Astronuclear system

### Content :

Global aspects of stellar object, such as the mass-radius relation, are determined by the equations of hydrostatic equilibrium, known as TOV (Tolman-Oppenheimer-Volkov) equations. A few exact solutions are known for a realistic pressure-density relation (equation of state, EOS). These equations must be numerically solved to obtain the M-R relation. From EOS a family of different astronomical models parameterized by the central density  $\rho_c$  can be proposed. Recently Brussels-Montreal group developed unified EoS for cold catalysed nuclear matter: BSk19, BSk20 and BSk21 based on generalized Skyrme effective nucleon-nucleon interactions. Each of these EOS is unified that is it describes the crust and the core of a stellar object using the same Physical model. Analytical expressions for several related quantities that are required in different stellar object simulations: number fractions of electrons and muons in the stellar core, nucleon numbers per nucleus in the inner crust, and equivalent radii and shape parameters of the nuclei in the inner crust calculated based on these three EOS. After obtaining analytical representation for the basic characteristics of the models of cold dense matter, we are trying to study different macroscopic property of stars like entropy, electron transport, electrical conductivity etc in the star crust.

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**Session classification :** --not yet classified--

**Track classification :** --not yet classified--

**Type :** Poster