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Towards a unified quark-hadron equation of state for neutron stars, supernovae and heavy-ion collisions

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The aim of our work is to develop a unified equation of state (EoS) for nuclear and quark matter for a wide range in temperature, density and isospin so that it becomes applicable for heavy-ion collisions as well as for the astrophysics of neutron stars, their mergers and supernova explosions. As a first step, we use improved EoS for the hadronic and quark matter phases and join them via Maxwell construction.
For this we work with a generalized density functional approach for the self energies in a quasi particle picture, which gives us the possibility to start with a reasonable physical basis and apply improvements to fit certain constraints from lattice QCD and neutron star measurements.

List of tracks

QCD phase diagram (BES)

Author: BASTIAN, Niels-Uwe (University of Wroclaw)

Co-authors: BLASCHKE, David (University of Wroclaw); Dr FISCHER, Tobias (Institute of Theoretical Physics, University of Wroclaw); Mr KALTENBORN, Mark Alexander Randolph (The George Washington University); Dr TYPEL, Stefan (GSI Helmholtzzentrum f`ur Schwerionenforschung GmbH)

Presenter: BASTIAN, Niels-Uwe (University of Wroclaw)

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