Contribution ID: **185** Type: **Oral**

Finite-temperature nuclear response in the relativistic framework

Tuesday, 14 May 2019 12:00 (20 minutes)

Recent developments of the relativistic nuclear field theory on the finite-temperature formalism will be presented. The general non-perturbative framework, which advances the nuclear response theory beyond the one-loop approximation, is formulated in terms of a closed system of non-linear equations for the two-body Green's functions. This provides a direct link to ab initio theories and allows for an assessment of accuracy of the approach. This framework has been extended recently to the case of finite temperature, for both neutral and charge-exchange channels [1-3]. For this purpose, the time blocking approximation to the time-dependent part of the in-medium nucleon-nucleon interaction amplitude is adopted for the thermal (imaginary-time) Green's function formalism. The method is implemented self-consistently on the base of Quantum Hadrodynamics and designed to connect the high-energy scale of heavy mesons and the low-energy domain of nuclear medium polarization effects in a parameter-free way, now also at finite temperature. In this approach we investigate the temperature dependence of nuclear spectra in various channels, such as the monopole, dipole, quadrupole and charge-exchange ones, for even-even medium-heavy nuclei. The special focus is put on the giant dipole resonance's width problem, the low-energy strength distributions and the influence of temperature on the equation of state. The temperature dependence of the spin-isospin excitations is studied for its potential impact on the astrophysical modeling of supernovae and neutron-star mergers.

References

[1] E. Litvinova and H. Wibowo, Phys. Rev. Lett. 121, 082501 (2018).
[2] H. Wibowo and E. Litvinova, arXiv:1810.01456, submitted to Phys. Rev. C.; E. Litvinova and H. Wibowo, arXiv:1812.11751, submitted to Eur. Phys. J. A.
[3] E. Litvinova, C. Robin and H. Wibowo, arXiv:1808.07223.

Primary authors: Prof. LITVINOVA, Elena (Western Michigan University and National Superconducting Cyclotron Laboratory, Michigan State University); Mr WIBOWO, Herlik (Western Michigan University)

Presenter: Prof. LITVINOVA, Elena (Western Michigan University and National Superconducting Cyclotron Laboratory, Michigan State University)

Session Classification: Session VI