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Vector and Axial-Vector Mesons in Nuclear Matter

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We present recent results on the in-medium spectral function of the $\rho(770)$ vector meson and the $a_1(1260)$ axial-vector meson in nuclear matter, as well as on the resulting thermal dilepton rate. As an effective description of the thermodynamics and the phase structure of nuclear matter we use a chiral baryon-meson model, taking into account the effects of fluctuations from scalar mesons, nucleons, and vector mesons within the Functional Renormalization Group (FRG) approach. Our results show strong modifications of the spectral functions in particular near the chiral critical endpoint which suggest an enhanced dilepton yield at lower energies. Such an enhancement is also found in GiBUU transport simulations for C+C at 1A GeV when including effects of chiral symmetry restoration in the kinetic equations for baryon propagation. Our results may therefore well be of relevance for electromagnetic rates in heavy-ion collisions and help to identify phase transitions and the critical endpoint.

Experiment/Theory

Theory/Phenomenology

Affiliation

- [1,2] Justus Liebig University Giessen
- [1,2] Helmholtz Research Academy Hesse for FAIR (HFHF), Campus Giessen
- [3] TU Darmstadt

Hauptautoren: Dr. TRIPOLT, Ralf-Arno (Justus Liebig University Giessen); Prof. VON SMEKAL, Lorenz (Justus Liebig University Giessen); Prof. WAMBACH, Jochen (TU Darmstadt)

Vortragende(r): Dr. TRIPOLT, Ralf-Arno (Justus Liebig University Giessen)

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