

Mesons at finite temperature and density from the FRG

We present recent results on in-medium spectral functions of mesons with a particular emphasis on 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 may lead to an enhanced dilepton yield at low invariant masses in heavy-ion collision experiments. Recent results from transport simulations tend to support this effect and will also be discussed. Our results may therefore well be of relevance for electromagnetic rates in heavy-ion collisions or neutrino emissivities in neutron-star merger events and help to identify phase transitions and the critical endpoint.

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