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## Equation of State and Collective Modes in the Quark-Gluon Plasma near $T_c$

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### Content

Based on a Hamiltonian approach with in-medium Cornell potential we evaluate the many-body properties of the quark-gluon plasma (QGP) in the nonperturbative regime. The in-medium two-body potential is constrained by lattice-QCD data on the heavy-quark free energy. The equation of state is computed in the Luttinger-Ward-Baym formalism with selfconsistent off-shell propagators and T-matrix. A novel technique is used to resum the skeleton diagrams to all orders which accounts for the formation of hadronic bound states. The latter become the dominant degrees of freedom as  $T_c$  is approached from above while inducing very large scattering rates of the quarks and gluons who are no longer good quasi-particles. The strongly coupled nature of the QGP is thus intimately connected with the transition from parton to hadron degrees of freedom, with an essential role played by quantum effects. Our approach furthermore allows for a systematic calculation of transport properties of the medium.

### Session

Collectivity in high energy collisions

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