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Repulsive interactions and their effects on the thermodynamics

Friday 4 November 2016 18:35 (20 minutes)

In this talk we compare two approaches in modeling repulsive interactions among hadrons: the excluded-volume approximation and the S-matrix formalism. The latter provides a consistent treatment of broad resonances based on empirical scattering phase shifts. We shall apply these techniques to study the thermodynamics of the ($\pi N\Delta$) system, with a particular focus on the fluctuation of Baryon charge in the thermal medium.

We show that the introduction of an excluded volume between pions and nucleons, in addition to the interaction that generates the Δ resonance, distorts the phase shift in the P_{33} channel and hence leads to an inconsistent description of the interaction contribution to the thermodynamics.

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