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Meson Properties at Finite Density

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Quantum Chromodynamics (QCD), the theory of the strong interaction, has been remarkably successful in describing high-energy and short-distance-scale experiments involving quarks and gluons. However, applying QCD to low energy and large-distance-scale experiments has been a major challenge. The symmetries of QCD (such as Chiral Symmetry) provide guiding principles to deal with strong interaction phenomena in the non-perturbative domain. Various QCD-inspired models predict a modification of the properties of hadrons in nuclear matter from their free-space values. A review of experiments searching for the in-medium modifications of light mesons will be given trying to assess if they confirm or refute these theoretical predictions. The majority of experiments both with relativistic heavy-ion reactions as well as with elementary reactions observe a substantial broadening of the width of light vector mesons inside the nuclear medium, with no evidence of a mass shift. Several complementary high statistics experiments are planned at JLab, GSI, JPARC and RHIC to further study the properties of mesons in the medium.