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Meson nucleus bound states studied with high-resolution missing-mass spectroscopy

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Meson-nucleus bound states, such as mesic atoms and nuclei, are important topics in hadron physics as they provide valuable information on the properties of hadrons at finite nuclear density. For example, deeply-bound pionic atoms have been intensively studied with missing-mass spectroscopy of the (d,3He) reaction and have led to the experimental evaluation of partial restoration of chiral symmetry at finite matter density. Recently, eta'-mesic nuclei are also attracting both theoretical and experimental interests due to their relation to axial U(1) anomaly and chiral symmetry breaking in QCD. Various experiments have been performed including the recent WASA-FRS experiment, which combines the large acceptance WASA detector system with the high-resolution forward spectrometer FRS at GSI. In this talk, we introduce general motivations for these studies of meson-nucleus bound states and present current status of the experiments performed with high-resolution missing-mass spectroscopy.

Collaboration

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