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Future measurements of vector mesons in nucleus at J-PARC

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Mass spectra of vector mesons attract wide interest in high energy heavy ion physics and hadron physics in the point of view of restoration of chiral symmetry and hadron mass. The mass spectra of vector mesons are theoretically connected to qbar-q contents of a QCD medium. Even in nucleus matter, modifications of vector mesons are predicted[1].

The KEK-PS E325 experiment was performed to study mass properties of vector mesons and partial chiral symmetry restoration in nuclear medium. The KEK experiment measure mass spectra of phi mesons using electron-positron decays. The experiment reports significant mass modification in nucleus[2]. New experiment is being prepared at J-PARC to continue this measurement. In this presentation, details of new experiment are presented.

A new beam line is under construction at the Hadron Experimental Facility of the Japan Proton Accelerator Research Complex (J-PARC) to perform the experiment. A new beam line delivers a primary 30 GeV proton beam and intensities of the beam is 10^10 Hz.

The first experiment using the beam line is under preparation. The experiment will measure mass spectra of vector mesons in nucleus with 100 times larger statistics than the KEK-PS E325 experiment. The new experiment aims to confirm results of the previous KEK experiment and have a large statistics to discuss more details. The new experiment uses new detector techniques, such as a GEM tracker and a Hadron Blind Detector, to achieve such a large statistics.

[1] T. Hatsuda and S.H. Lee, Phys. Rev. C46 (1992) R34

[2] R. Muto et al. (KEK-PS E325 collaboration), Phys. Rev. Lett. 98(2007), 042501

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