

## Systematic study of the vector meson spectral modification in the nuclear medium at J-PARC

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The spontaneous breaking of chiral symmetry is considered to be the origin of hadron mass. An order parameter of chiral symmetry breaking is a quark anti-quark condensate, but it is not observable. Instead, the spectral function of vector mesons is predicted to be changed in a hot and/or dense medium through the restoration of chiral symmetry. The J-PARC E16 experiment is proposed to study the spectral modification of vector meson in nuclei as a dense medium. The mass spectrum of  $\phi$  meson is measured using  $p+A \rightarrow \phi \rightarrow e+e-$  reactions at J-PARC high-momentum beam line. The high precision measurement with high statistics enables to investigate dependence of spectral modification on the size of target nuclei, and also on the momentum of  $\phi$  mesons systematically. The spectrometer is designed to keep a good mass resolution as 5 MeV at  $\phi$  meson and enough electron-identification capability in a high counting rate environment expected at J-PARC. The detectors have been developed and sufficient performances are achieved for the experiment. The details of physics goal and preparation status of J-PARC E16 experiment are presented.

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