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Medium modifications of the ρ vector meson in photoproduction off nuclei RAKHSHA NASSERIPOUR, CHADEN DJALALI, University of South Carolina, MICHAEL WOOD, University of Massachusetts, Amherst, DENNIS WEYGAND, Jefferson Laboratory, CLAS COLLABORATION — Theoretical calculations predict the modification of properties of vector mesons, such as a shift in their masses and/or broadening of their widths in dense nuclear matter. These effects can be related to partial restoration of chiral symmetry at high density or temperature. To explore these, we performed an experiment at Jefferson Lab using the CEBAF Large Acceptance Spectrometer (CLAS). The data were taken with a beam of tagged photons with energies up to 4 GeV on various nuclear targets. The properties of the ρ vector mesons were investigated via their rare leptonic decay to e^+e^- . This decay channel is preferred over hadronic modes in order to eliminate final state interactions in the nuclear matter. The combinatorial background in the mass spectrum was removed by a self-normalizing mixed-event technique. The ρ mass distributions were extracted for each of the targets. We obtained statistically significant results regarding medium modification of the ρ in the nuclear medium that rule out large medium effects (mass shift parameter $\alpha > 0.1$) within the 99% confidence level.

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