

Abstract Submitted
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Accessing the real part of the forward elastic J/ψ -p and Φ -p threshold scattering amplitudes OLEKSII GRYNIAK, MARC VANDERHAEGHEN, University Mainz — We provide an updated analysis of the forward J/ψ -p scattering amplitude, relating its imaginary part to $\gamma p \rightarrow J/\psi p$ and $\gamma p \rightarrow c\bar{c}X$ cross section data, and calculating its real part through a once-subtracted dispersion relation. From a global fit to both differential and total cross section data, we extract a value for the spin-averaged J/ψ -p s-wave scattering length $a_{\psi p} = 0.046 \pm 0.005$ fm, which can be translated into a J/ψ binding energy in nuclear matter $B_{\psi} = 2.7 \pm 0.3$ MeV. We estimate the forward-backward asymmetry to the $\gamma p \rightarrow e^-e^+p$ process around the J/ψ resonance, which results from interchanging the leptons in the interference between the J/ψ production and the Bethe-Heitler mechanisms. We show that this asymmetry can reach values around -25%. Its measurement can thus provide a very sensitive observable for a refined extraction of $a_{\psi p}$. A preliminary analysis of the ϕ -p forward scattering led to the estimated forward-backward asymmetry reaching values of about -20% for the beam energies $E = 2.2, 4.4$ GeV. The suitable kinematics were investigated for the specific setup of HMS and SHMS detectors of Hall C at JLab. Studies for the other JLab experiments (e.g. GlueX, SOLID) are ongoing.

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