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Hadronic decays of the ω meson measured with WASA-at-COSY

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Collaboration

WASA-at-COSY

Abstract content

Decay studies of the ω, a light vector meson, covers a span of interesting physics including 3π decay dynamics, the $\rho - \omega$ mixing and the $\omega - \pi^0$ transition form factor. The ongoing study presented by this poster covers the first two mentioned topics through measurements of the $\omega \to \pi^+\pi^-\pi^0$ and $\omega \to \pi^+\pi^-$ channels where the ω was produced in the $p + d \to {}^3He + \omega$ reaction and measured with the experimental setup of WASA-at-COSY. A high statistics study of the $\omega \to \pi^+\pi^-\pi^0$ dynamics can provide quantitative experimental verification of the predicted onset of the ρ in the decay process as well as the impact of $\pi - \pi$ interactions. This study has the goal of providing experimental values of a parametrisation of the Dalitz plot for a comparison with current theoretical predictions, [1,2]. The isospin breaking $\omega \to \pi^+\pi^-$ decay can give insight into the behaviour of the $\rho - \omega$ mixing. This channel has already been widely studied in e^+e^- collisions where the interference has been conclusively shown as destructive [3]. Only a few measurements with limited statistics have been performed for hadronic production of the ω meson with hints of a possible constructive interference 4]. The aim of this study is to investigate the structure of the $\omega \to \pi^+\pi^-$ signal in proton on deuteron collisions.

[1] C.Terschlüsen, B.Strandberg, S.Leupold and F.Eichstädt, arXiv:1305.1181 [hep-ph] [2] F.Niecknig, B.Kubis and S.P.Schneider, Eur.Phys. J. C72 (2012) 2014 [3] R.R.Akhmetshin et al., Phys. Lett. B527 (2002) 161 [4] B.N.Ratcliff et al., Phys. Lett. B38 (1972) 345

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