

Hadronic decays of the omega meson

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Studies of the decay reactions $\omega \rightarrow \pi^+ \pi^- \pi^0$ and $\omega \rightarrow \pi^+ \pi^-$ will be presented. The data used for this study was collected by the WASA-at-COSY collaboration where the omega mesons were produced through the reaction $p + d \rightarrow {}^3\text{He} + \omega$. These studies are part of an ongoing PhD project in the nuclear physics group at Uppsala university.

The decay mechanism for the $\omega \rightarrow \pi^+ \pi^- \pi^0$ channel can be studied in detail through the doubly differential decay width distribution, also called a Dalitz plot. Previous measurements of such a plot are of limited statistics. A high-statistics Dalitz plot would allow for convincing tests of theoretical predictions of the decay mechanism and final state interactions.

The isospin breaking $\omega \rightarrow \pi^+ \pi^-$ 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. Only a few measurements with limited statistics have been performed for hadronic production of the omega meson with hints of a possible constructive interference. The aim of this study is to investigate the structure of the $\omega \rightarrow \pi^+ \pi^-$ signal in proton on deuteron collisions.

Primary author: Ms HEIJKENSKJÖLD, Lena (Uppsala University)

Presenter: Ms HEIJKENSKJÖLD, Lena (Uppsala University)

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