Investigation of neutral multi pion final states in the CELSIUS/WASA experiment

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In the WASA experiment [1] at the CELSIUS storage ring at Uppsala, Sweden, the rare and not so rare decays of the η meson produced in pp and pd reactions are investigated. To obtain the necessary high luminosities a unique target of frozen Hydrogen or Deuterium pellets is used. A 4π CsI calorimeter together with a multilayered forward detector provide the necessary high acceptance and tagging accuracy.

During 2003 data were taken for the pp reaction with a mean luminosity of $5 \cdot 10^{30}$ cm^{-2} s^{-1} and projectile energies of 1300 MeV and 1360 MeV close to the η production threshold (1254 MeV). Here, emphasis is put on neutral η decay modes ($\gamma\gamma$ and $3\pi^0$) and the *prompt* $3\pi^0$ production.

A cross section estimate for prompt $3\pi^0$ production can be deduced by making use of the well known $\eta \rightarrow 3\pi^0$ decay width.

We present first results.

[1] J. Zabierowski et al., Physica Scripta T99 (2001) 159

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