Exclusive η production in proton proton reactions

I. Fröhlich
for the DISTO and HADES collaborations
II. Physikalisches Institut, University of Gießen, Germany

With the DISTO spectrometer (Saclay, France), exclusive η production in $\vec{p}p$ collisions have been measured at excess energies of Q = 324 MeV, 412 MeV and 554 MeV (corresponding to beam energies of T_{beam}=2.15, 2.50 and 2.85 GeV) via the $\pi^+\pi^-\pi^0$ decay channel. These data are the first measurement of all relevant degrees of freedom for a full description of the $pp\eta$ final state in this beam energy region [1]. This allows the projection on various kinematic variables, which will be presented: First, the Dalitz and momentum plots, describing the internal motion of the three particles. Furthermore, the alignment of the $pp\eta$ decay plane. In addition, the analyzing power will be presented.

The results will be compared to η production closer to threshold at excess energies $Q < 41$ MeV in proton proton reactions [2,3] and the theoretical interpretation [4,5].

The complete knowledge of all degrees of freedom for $pp \to pp\eta$ in this beam energy regime is as well important for the efficiency determination of the HADES dilepton spectometer. Here, the η is measured via the Dalitz decay $\eta \to e^+e^-\gamma$ [6]. In January 2004, a proton proton run has collected data with a beam energy of 2.2 GeV to provide this efficiency reaction.

[1] F. Balestra *et al.*, Phys. Rev. **C**, in print.

[2] H. Calén *et al.*, Phys. Lett. **B458**, 190 (1999).

[3] E. Roderburg *et al.*: Act. Phys. Pol. **B31**, 2299 (2000); P. Winter *et al.*, Phys. Lett. **B544**, 251 (2002); M. Abdel-Bary *et al.*, Eur. Phys. J. **A16**, 127 (2003).

[4] G. Fäldt and C. Wilkin: Phys. Scr. **64**, 427 (2001).

[5] K. Nakayama, J. Speth and T.-S. H. Lee: Phys. Rev. **C65**, 045210 (2002); K. Nakayama, J. Haidenbauer, C. Hanhard and J. Speth: Phys. Rev. **C68**, 045201 (2003).

[6] The HADES collaboration, see www-hades.gsi.de.

E-mail: Ingo.Froehlich@exp2.physik.uni-giessen.de