Analysis of the $pp \to pp\eta'$ reaction measured at COSY - 11

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Recently the total cross section for the $pp \to pp\eta'$ reaction was determined at a few beam energies [1, 2, 3]. The data allows for the first comparisons with theoretical models [4, 5], and indicates that the proton-η' interaction may have an repulsive character [6], in contrary to the proton-η interaction.

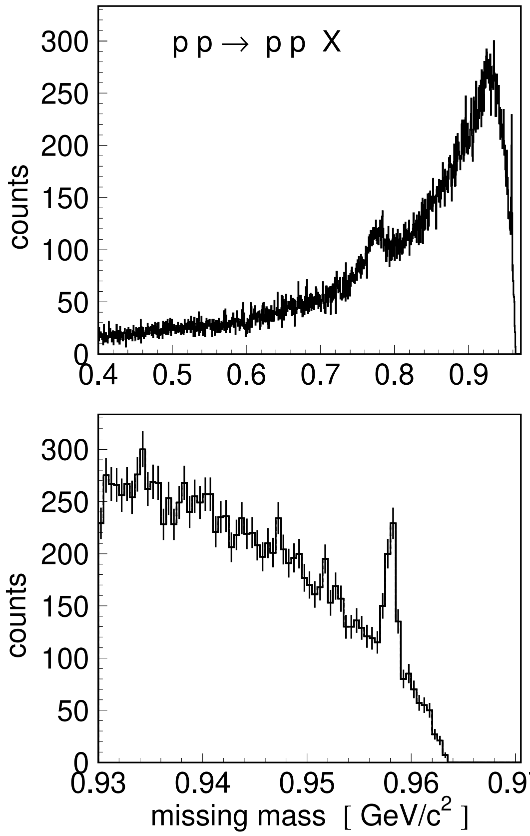

Figure 1: Missing mass in the $pp \to ppX$ reaction

In order to determine precisely the energy dependence for the $pp \to pp\eta'$ total cross section, the COSY - 11 Collaboration has continued the measurement at seven excess energies ranging between Q = 3 MeV and Q = 20 MeV. During the experiment the proton beam was cooled stochastically enlarging the luminosity and diminishing the beam momentum spread. Consequently, in comparison to the former measurements [1] the missing mass resolution was improved making the signal to the background ratio more pronounced, which is very important as far as the study of the differential cross section is concerned. The analysis of the data is in progress.

Figure 1 depicts the missing mass spectrum obtained for the $pp \to ppX$ reaction at the excess energy value of Q = 6 MeV. The upper picture shows the missing mass distribution at a broad mass range, where the clear peak corresponding to the production of the ω meson is visible at a mass value of 780 MeV/c^2. The very sharp peak originated in the η' production can also be seen at a mass value of 958 MeV/c^2. The signal of the $pp \to pp\eta'$ reaction is better to be seen in the lower picture, where the missing mass distribution only in vicinity of the kinematical limit is presented.

The evaluation of the cross section values is in progress.

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