

Thoughts to the Kaon pair production in the threshold region

Walter Oelert

for the COSY-11 collaboration

IKP Research Center Jülich, Germany

Total cross sections [1-4] of the reaction $pp \rightarrow ppK^+K^-$ at excess energies below $Q = 120 \text{ MeV}$ will be discussed. At low excess energies all available data points lie significantly above the various expectations as long as these predicted curves are all normalized to the DISTO point [4] at $Q = 114 \text{ MeV}$. The pure phase space differs by two orders of magnitude at $Q = 10 \text{ MeV}$ and a factor of five to ten at $Q = 28 \text{ MeV}$. An inclusion of the $pp - FSI$ results in closer agreement to the experimental data but does not fully account for the difference. Calculations [5] within a one-boson exchange model but not including the $pp - FSI$ reveal a similar discrepancy as the $pp - FSI$ parameterization. Up to now, there is no full calculation available but the new data of COSY11 demand for further theoretical efforts in order to give a complete picture of the K^+K^- production.

An important aspect might be the mass splitting between the neutral $K^0\bar{K}^0$ and charged K^+K^- kaons being in the order of 8 MeV . Based on the theoretical observation that the opening of the neutral kaon production channel shows a substantial influence on the $\pi\pi \rightarrow K^+K^-$ transition (c.f. Figure 2. in reference [6]), we tried a very simple minded Ansatz for the energy dependence of the excitation function for the $pp \rightarrow ppK^+K^-$ reaction assuming that with the opening of the neutral kaon channel (at 8 MeV excess energy) some yield is taken out of the charged kaon channel. As long as the total energy is large enough to produce the charged kaon pair but is below the neutral kaon channel all strength for the associated strangeness production is devoted to the K^+K^- creation. At 8 MeV excitation energy the charged channel faces the competition of the neutral one. Estimations of such a coupled channel effect will be presented and discussed.

- [1] P. Winter et al., to be published in Phys. Lett. B.
- [2] C. Quentmeier et al., Phys. Lett. B 575 276 (2001).
- [3] M. Wolke, Dissertation, Munster, 1997, IKP JÜL. 3532.
- [4] F. Balestra et al., Phys. Rev. C 63 024004 (2001).
- [5] A. Sibirtsev, et al., Z.Phys. A 358 1001 (1997).
- [6] O. Krehl, et al., Phys. Lett. B 390 23 (1997).

E-mail: w.oelert@fz-juelich.de