

# Hadron Physics with Diproton Final States

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The possibility to select reliably the diproton final state with small excitation energy with the ANKE spectrometer at COSY-Juelich gives one a new tool to study hadron interactions at intermediate energies. In this case the final proton pairs are found presumably in the  $^1S_0$  state which simplifies significantly the theoretical analysis. This approach has been successfully applied to the reactions  $pd \rightarrow (pp)_s n$  at high and low momentum transfer kinematics, as well as to the  $pp \rightarrow (pp)_s \pi^0$  and  $pp \rightarrow (pp)_s \gamma$  processes. In particular, single pion production in nucleon-nucleon collisions,  $NN \rightarrow NN\pi^0$ , is one of the principal tools used in the investigation of  $NN$  dynamics at intermediate energies. Because of large momentum transfers involved, even close to threshold, such a meson production is sensitive to the short-distance part of the  $NN$ -interaction. The ratio of  $pp \rightarrow (pp)_s(0^0)\pi^0$  to  $pp \rightarrow d(0^0)\pi^+$  cross sections can provide information on the relative strength of spin-singlet to spin-triplet production. The  $pp \rightarrow (pp)_s \pi^0$  differential cross section has been measured with the ANKE spectrometer at COSY-Juelich for seven proton beam energies  $T_p$  between 0.5 and 2.0 GeV. The obtained energy dependence of the cross section and of the singlet/triplet ratio will be presented. The future programme of studies of  $\pi$ -meson production in  $NN \rightarrow (NN)_s \pi$  at ANKE, including single and double polarized measurements, will also be discussed.

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