Phenomenological studies of the low energy dynamics in the ppK^+K^- system

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The experimental data for the $pp \to ppK^+K^-$ reaction collected systematically below [1-3] and above [4-6] the ϕ meson threshold revealed a significant enhancement in the shape of the excitation function near the kinematical threshold. This enhancement may be due to the final state interaction (FSI) in the ppK^+K^- system, including the formation of exotic K^-p or K^+K^- bound states which existence would explain the nature of the $\Lambda(1405)$ and $f_0(980)$ resonances, respectively. The differential spectra obtained by the COSY-11 [3,8] and ANKE [4] groups indicate a strong interaction in the pK^- an ppK^- subsystems, which suggests that this reaction may be driven by the $\Lambda(1405)$ production: $pp \to K^+\Lambda(1405) \to ppK^+K^-$. On the other hand, the phenomenological model proposed by the ANKE collaboration based on the factorization of the final state interaction into interactions in the pp and pK^- subsystems describes the experimental pK^- an ppK^- invariant mass distributions, but the data very close to kinematical threshold remain underestimated, which indicates that in this region the influence of the K^+K^- final state interaction may be significant [4,8,9]. Motivated by this observation the COSY–11 collaboration has estimated the scattering length of the K^+K^- interaction based for the first time on the low energy $pp \to ppK^+K^-$ Goldhaber Plot distributions measured at excess energies of Q = 10 MeV and 28 MeV [8].
In this talk we present results of the K^+K^-–FSI studies combining the Goldhaber Plot distributions established by the COSY–11 group with the experimental excitation function near threshold. We summarize also present knowledge about the mechanism of near threshold $pp \to ppK^+K^-$ reaction.

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