Quasi-bound and scattering states in the $\bar{K}NN - \pi\Sigma N$ system

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Quasi-bound states as well as the scattering characteristics of the $\bar{K}NN - \pi\Sigma N$ system with different quantum numbers were investigated. New calculations of the K^-pp quasi-bound states and K^-d scattering were performed using three-body Faddeev-type AGS equations with coupled channels. The $\bar{K}N$ interaction, being an input for the equations, is described by several energy dependent and independent potentials. The potentials properly reproduce experimental data on K^-p scattering and $1s$ level shifts and widths of kaonic hydrogen.

The obtained three-body K^-d amplitudes were then used for construction an optical $K^- - d$ potential. The Lippmann-Schwinger equation with the potential and directly included Coulomb interaction was solved and the $1s$ level shift and width of the kaonic deuterium were obtained.

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