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Recent progress in ab-initio four-body scattering calculations

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In this contribution, we discuss some recent developments in the study of four-nucleon scattering. In the first part of the talk, we will focus on n - ^3H and p - ^3He elastic scattering below the trinucleon disintegration thresholds, where a detailed comparison between the phase-shifts calculated using three different theoretical approaches (the Alt, Grassberger-Sandhas, Hyperspherical-Harmonics, and Faddeev-Yakubovsky methods) has been recently completed. Moreover, we will report on the study of the charge exchange reaction $^3\text{He}(n,p)^3\text{H}$ reaction. In the second part of the talk, we will discuss the calculation of the longitudinal asymmetry induced by parity-violating (PV) components in the nucleon-nucleon interaction in the $^3\text{He}(n,p)^3\text{H}$ reaction.

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