Progress in the ability to perform dedicated experiments as well as the increasingly better understanding of nuclear forces opens up the possibility of studying previously unattainable polarization phenomena in nuclear systems.
In the first part of the talk I will discuss the possibility of using scattering experiments with three or four polarized particles to study three-nucleon forces. In the second part of the presentation I will focus on quantum entanglement in nucleon-nucleon and nucleon-deuteron scattering reactions. Specifically, I will discuss the existence of the pure polarization states in the final states of elastic neutron-proton scattering, and of elastic neutron-deuteron scattering with both particles polarized in the initial states.