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Development of a Polarized H/D Gas Target at IMP

In high-energy nuclear physics, spin plays a crucial role in the composition of matter and the interaction between particles. The Institute of Modern Physics, Chinese Academy of Sciences, plans to develop polarized beams and targets for spin-related studies at the High Intensity heavy-ion Accelerator Facility (HIAF). The target is mainly composed of an atomic beam source, a target chamber and a Breit-Rabi polarimeter. Currently, design work for a high-performance polarized H/D gas target, including mechanical design and track/spin simulation, is ongoing.

In order to achieve high beam intensity and high degree of polarization, the spin-filtering sextupole magnets and the spin-flipping transition units, are emulated in terms of atomic spin\trajectory tracking and numerical calculations of hyperfine transition via solving the time-dependent Schrödinger equation. In this talk, I will present the current status of our target design, with an emphasis on key component optimization.

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Track Classification: Polarized ion and lepton sources and targets