

Developement of polarized solid target for nuclear physics exteriment

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I will present an overview of our activities on the study of the three-nucleon force using a polarized deuteron beam and a polarized proton target at RIKEN, with particular focus on the polarized proton target. We have developed the target system based on Dynamic Nuclear Polarization with photoexcited triplet electrons (Triplet-DNP), operating at 0.4 T and room temperature. Low-field operation reduces the effect of particle trajectories with kinetic energies below 200 MeV, while room-temperature operation mitigates radiation damage through the spontaneous repair of unwanted radicals. Recently, we achieved over 60% ^1H polarization using a new material, dibenz[a,h]anthracene. The low-field and room-temperature polarized solid target allows impractical experiments with the conventional target system, leading to a next-generation spin-dependent accelerator science.

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