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Progress of a polarized ^{3}He–laser target for the exploration of spin effects in laser-induced plasmas

Abstract In order to investigate the polarization degree of laser-accelerated ^{3}He ions from a polarized ^{3}He gas–jet target, several challenges have to be overcome. One of these is the development of an appropriate polarized ^{3}He gas–jet target suitable for laser–acceleration experiments. The essential components of such a layout are a magnetic holding field for storing polarized ^{3}He gas inside the vacuum chamber for many hours, an *in situ* measurement technique of the ^{3}He–gas polarization for monitoring the given polarization degree of the pure gas during storage and before each laser shot, the gas–jet source for providing the desired laser target, and finally, a polarimeter for measuring the spin-polarization degree of laser-accelerated $^3He^{2+}$ ions. The main components have been manufactured at Forschungszentrum Jülich and are currently being tested. In the framework of this talk, the progress of the preparatory studies is presented.