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Improved Performance & Future Prospects for Laser-Polarized ^{3}He Nuclear Targets AL TOBIAS, PETER DOLPH, KAREN MOONEY, VLADIMIR NELYUBIN, JAIDEEP SINGH, GORDON CATES, University of Virginia — High pressure polarized ^{3}He gas targets have been used in electron scattering experiments at Bates, SLAC and JLab. The ^{3}He nuclei are polarized via spin exchange with an optically pumped alkali metal vapor such as Rb. Light from spectrally narrowed diode lasers results in higher optical pumping rates since the laser is better matched to the Rb absorption line than broadband lasers. A hybrid mixture of K and Rb allows one to take advantage of the more efficient spin exchange between K and ^{3}He while still using lasers that are tuned to the Rb D1 line. The combination of narrowed lasers and a hybrid of K and Rb in the cell have allowed ^{3}He polarizations to consistantly reach above 60%, sometimes as high as 70%, which is significantly better than 40% typically achieved via pure Rb cells pumped with broadband lasers. Upcoming experiments at JLab will require targets to maintain high polarization even with increased beam current. We'll discuss the prospects of a gold coated metal target chamber which can allow for higher incident beam currents and induced convection of the ^{3}He gas in the cell which can reduce beam depolarization effects.

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