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Next-Generation Polarized ^3He Targets for Electron Scattering Experiments YUNXIAO WANG, MADUKA KALUARACHCHI, DANIEL MATYAS, GORDON CATES, University of Virginia, TARGET GROUP OF THE SUPER BIGBITE COLLABORATION — A next-generation spin-exchange polarized ^3He target will be described that is being developed for high-luminosity experiments that will follow the JLab 12 GeV upgrade, including a measurement of neutron elastic form-factor ratio G_E^n/G_M^n , up to 10 GeV^2 . Spin-exchange polarized ^3He target cells have historically had two chambers: a pumping chamber, in which the ^3He is polarized, and a target chamber, through which the electron beam passes. In the past, the mixing of gas between the two chambers has been due to diffusion through a single *transfer tube*, something that limits polarization at high electron-beam currents. In the next-generation targets, two transfer tubes will be used, one of which is heated, in order to produce well-controlled and rapid convective flow. Further innovations include the use of two pumping chambers, so that gas can be polarized more quickly, and metal end windows. Space limitations make it challenging to limit the magnetic-field inhomogeneities experienced by these new larger targets, so particular effort is going into understanding and controlling polarization losses during polarimetry measurements. Results will be presented on prototype targets developed for a measurement of the spin asymmetry A_1^n in JLab's Hall A.

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