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Optical Pumping Wavefront Propagation[1] ZACHARY DELAND, BRIAN LANCOR, THAD WALKER, University of Wisconsin - Madison — We present a method of tracking the propagation of a slow-moving optical pumping wavefront in an optically thick rubidium cell. An unpolarized gas of rubidium atoms initially presents an opaque medium for a resonant D1 circularly polarized pump laser. However, absorption of the pump beam optically pumps atoms into a state of near transparency. This allows beam propagation through the cell with a velocity proportional to the absorption rate. The progress of the beam propagation can be tracked by measuring the line average polarization of the cell as a function of time, using the Faraday rotation of a probe beam. We will present simulations and results demonstrating the progress of this optical pumping wavefront as it pumps the entire cell to transparency. This is an important diagnostic for testing models of spin-exchange optical pumping of ^{3}He. This work is funded by the DOE.

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