

Spin Flipping and Polarization Lifetimes of a 270 MeV Deuteron Beam*

V.S. Morozov¹, M.Q. Crawford¹, Z.B. Etienne¹, M.C. Kandes¹, A.D. Krisch¹,
M.A. Leonova¹, D.W. Sivers¹, V.K. Wong¹, K. Yonehara¹, V.A. Anferov²,
H.O. Meyer², P. Schwandt², E.J. Stephenson², B. von Przewoski²

¹ Spin Physics Center, University of Michigan, Ann Arbor, Michigan 48109-1120

² Indiana University Cyclotron Facility, Bloomington, Indiana 47408-0768

We recently studied spin flipping with a 270 MeV vertically polarized deuteron beam stored in the IUCF Cooler Ring. We swept an rf solenoid's frequency through, or partly through, an rf-induced spin resonance and observed an effect on the beam's vector and tensor polarizations. After optimizing the resonance crossing rate and setting the solenoid's voltage to its maximum value, we obtained a preliminary spin-flip efficiency of about 94 ± 1 % for the vector polarization; we also observed a partial spin-flip of the tensor polarization. We also used the rf-induced resonance to study the lifetimes of the vector and tensor polarizations. We measured these lifetimes at different distances from the resonance and then calculated the preliminary polarization lifetime ratio $\tau_{\text{vector}} / \tau_{\text{tensor}}$ to be about 1.9 ± 0.4 .

*Supported by research grants from the U.S. Department of Energy and the U.S. National Science Foundation.