

Abstract Submitted
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Studies of Polarization Rotation in a Storage Ring¹ ERICK SMITH, Northwest Nazarene University, E.J. STEPHENSON, Indiana University Cyclotron Facility — A published proposal for an electric dipole moment search on the deuteron [PRL **96**, 214802] requires that the deuteron beam be polarized horizontally in the plane of a storage ring. The beam is vertically polarized at injection and, through the action of an RF solenoid operating for a fixed time, this polarization must be precessed into the horizontal plane. Treating the precession classically, we investigated ramping the solenoid frequency until it reached the spin tune resonance at $\nu_s = G\gamma f_{cyc}$. As a limiting case, we also investigated operating at ν_s for a fixed time. The parameters for these simulations were taken from recent studies [PRSTAB **8**, 099002] at COSY where this scheme will be tested. We have demonstrated that our model can reproduce the results of these studies of deuteron spin flip, including the effects of momentum spread. We show that beam bunching is required to maintain the polarization. Some sensitivity to momentum spread remains at second order, an effect that also contributes to the polarization decoherence time once the polarization is horizontal.

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