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Experimental test of the Chao matrix formalism for spin dynamics. V.S. MOROZOV, A.W. CHAO, A.D. KRISCH, M.A. LEONOVA, R.S. RAYMOND, D.W. SIVERS, V.K. WONG, Univ. of Michigan, Ann Arbor, MI 48109-1120, R. GEBEL, A. LEHRACH, B. LORENTZ, R. MAIER, D. PRASUHN, A. SCHNASE, H. STOCKHORST, Forschungszentrum Juelich, IKP, D-52425 Juelich, F. HINTERBERGER, K. ULBRICH, Helmholtz Inst., Univ. Bonn, D-53115 Bonn — We recently started testing Chao's proposed new matrix formalism for describing the spin dynamics due to a single spin resonance in a stored polarized beam. This formalism seems to be the first generalization of the Froissart-Stora equation since it was published in 1960. It allows one to calculate analytically the polarization's behavior inside a resonance, which is not possible using the Froissart-Stora equation. We recently tested some Chao formalism predictions using a 1.85 GeV/c polarized deuteron beam stored in COSY. We swept an rf dipole's frequency through 200 Hz, at different sweep rates, while varying the distance from the sweep's end frequency to an rf-induced spin resonance's central frequency. We compared our experimental data with the predictions of the Chao formalism and the prediction of a phenomenological Froissart-Stora-based two-fluid model. The Froissart-Stora formula itself can make no prediction inside the resonance. The data seem to support the validity of the Chao formalism. (Supported by the German BMBF Science Ministry.)

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