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Calculation of intrinsic damping in half metals CHUNSHENG LIU, CLAUDIA K.A. MEWES, MAIRBEK CHSHIEV, TIM MEWES, WILLIAM H. BUTLER, MINT Center, University of Alabama, Tuscaloosa, AL — The extended Hueckel tight binding method in combination with Kambersky's torque correlation model [1] is used to calculate the precessional magnetization relaxation in half-metallic systems. In Kambersky's model damping is described by a combination of spin-flip excitations and orbital excitations. An analytical expression of the transition matrix element which represents scattering events within a single band (intraband) and between different bands (interband) respectively [2] can be obtained within the TB scheme, which enables a better understanding of the damping mechanisms in half-metallic structures. Due to the absence of spin-flip scattering in half-metallic systems, the Gilbert damping rate of half-metals is expected to be much smaller than that of metals. Using this approach we calculated the damping for different half-metallic structures. The minimum intrinisic relaxation rate λ was calculated to be, 3.2 MHz, 1.1 MHz, 0.13 MHz, for the Heusler structures Co_2MnGe , Co_2MnSi and the Rutile structure CrO_2 respectively. The damping rates for these half-metallic materials are much lower than that of bcc Fe, as we anticipated from the analytical analysis. References: [1] V. Kambersky, Czech. J. Phys. B 26, 1366 (1976). [2] K. Gilmore, Y.U. Idzerda and M.D. Stiles, Phys. Rev. Lett. 99, 027204 (2007).

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