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Evaluation of Gilbert damping in transition metals using tight binding schemes CHUNSHENG LIU, CLAUDIA K.A. MEWES, MAIRBEK CHSHIEV, TIM MEWES, WILLIAM H. BUTLER, Center for Materials for Information Technology, The University of Alabama, Tuscaloosa, AL — Recently first principle calculations of the damping in transition metals have reproduced the unusual temperature dependence observed experimentally [1, 2]. Here we present an alternative method to calculate the Gilbert damping within Kamberský's spin torque correlation model using a combination of first principle calculations and an extended Hückel tight binding model. In our scheme we use ab initio calculations (VASP) including spin orbit coupling to obtain the band structure of the transition metal of interest. With the knowledge of the band structure we use a fitting procedure to construct an extended Hückel tight binding model which then allows the evaluation of the Gilbert damping parameter. Because of the simplicity of our Hamiltonian, we can converge the integral over the Brillouin of the spin-orbit torque without extraordinary computational effort. We show that our results are in good agreement with the results obtained from previous calculations. [1] K. Gilmore, Y.U. Idzerda and M.D. Stiles, Phys. Rev. Let. **99**, 027204 (2007). [2] V. Kamberský, Phys. Rev. B **76**, 134416 (2007).

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