Anisotropic Damping in Single-Crystalline Ni/MgO(001) studied by the Time-Resolved Magneto-Optical Kerr effect (TR-MOKE) KEVIN SMITH, A. LUKASZEW, J. SKUZA, C. CLAVERO, K. YANG, A. REILLY, G. LÜPKE, College of William and Mary — The damping behavior of uniform spin precession in single-crystalline Ni/MgO(001) of various thicknesses from $t = 10$ nm to $t = 60$ nm is investigated in the time domain using TR-MOKE over a wide range of external field parameters and temperatures. Planar measurements indicate that the effective Gilbert damping parameter, $\alpha_{\text{eff}}$, is coupled to the magnetocrystalline anisotropy, as $\alpha_{\text{eff}}$ ranges from 0.05 near the hard axis to 0.10 near the easy axis. Previous experiments by other groups using FMR [1] and TR-MOKE on polycrystalline samples [2] have placed the intrinsic value of the damping at 0.045. When the field is applied normal to the film surface, $\alpha_{\text{eff}}$ increases to as high as 0.3 when the angle of the magnetization, $\phi_M$, is greater than 45 degrees out of plane. These results are discussed in terms of various models of extrinsic damping mechanisms, such as two magnon scattering. [1] S. Bhagat et al. Phys. Rev. B, 10 179 (1974) [2] J. Walwoski et al. J. Phys. D: Appl. Phys. 41 164016 (2008)