

Abstract Submitted  
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**Nonlinear alternating current susceptibilities of rotating microparticles in electrorheological fluids**<sup>1</sup> KIN WAH YU, Chinese University of Hong Kong, J.P. HUANG, W.J. TIAN, Fudan University — A perturbation approach [1] has been employed to investigate the nonlinear alternating current (AC) responses of the rotating microparticles in electrorheological (ER) fluids under AC or direct current electric fields. The shear flow of ER fluids exerts a torque on the particles and leads to the rotational motion of the particles about their centers [2]. We show that the dynamic effects can play a significant role in the AC responses. Our results can be conveniently interpreted in the dielectric dispersion spectral representation [3], thus offering a convenient method to determine the relaxation time and the rotation velocity of the ER particles by measuring the nonlinear AC responses.

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[3] Jun Lei, Jones T. K. Wan, K. W. Yu, and Hong Sun, Phys. Rev. E 64, 012903 (2001).

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