

Abstract Submitted  
for the DFD14 Meeting of  
The American Physical Society

**Diffusion of an ellipsoid in a quasi-2D bacteria suspension** YI PENG, XIANG CHENG, Department of Chemical Engineering and Materials Science, University of Minnesota, Minneapolis, MN, 55455, USA — Enhanced translational diffusion of spherical particles induced by a suspension of bacteria has been established as a distinct feature for active fluids. Here, instead of spherical tracer particles, we study the diffusion of ellipsoidal particles of various aspect ratios in a free-standing film of bacteria. Using high-speed digital video microscopy, we measured the mean-square displacements and calculated the translational and rotational diffusion coefficients of the elliptical tracer particles. We found that both the translational and rotational diffusion of the particles are dramatically enhanced by the motion of bacteria. The probability distribution functions for linear and angular displacements become non-Gaussian at high bacterial concentrations. Moreover, we also explored the coupling between translational and rotational diffusion induced by the swimming bacteria.

Yi Peng  
Department of Chemical Engineering and Materials Science,  
University of Minnesota, Minneapolis, MN, 55455, USA

Date submitted: 28 Jul 2014

Electronic form version 1.4