Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Microparticle Manipulation Using Inertial Forces MICHAEL EGLIN, Engineering-Physics, University of Wisconsin-Madison, MARK A. ERIKSSON, Physics, University of Wisconsin-Madison, ROBERT W. CARPICK, Engineering-Physics, University of Wisconsin-Madison — Manipulation (transport, positioning, separation, or removal) of micro- and nanoparticles has become an increasingly vibrant field of research. We present a simple method to transport a large number of microparticles in parallel. Piezoelectric shear plates are used to excite asymmetric shear waves which are coupled into a substrate. At the surface of the substrate, linear motion of particles is induced due to inertial forces on the particles and the stick-slip effect. While the approach is very versatile and can be used for a wide range of particle and substrate combinations, it is selective to the particle mass and the surface chemistry. In addition to the study of particle transport, the tribological behavior of the particles on the surface can be investigated by applying a symmetric waveform to the piezo, which allows the probing of the static friction force between the particle and substrate. A simple dynamic model to describe the behavior will be discussed. The frictional behavior of particles on chemically functionalized surfaces will be presented.

Michael Eglin
Engineering-Physics, University of Wisconsin-Madison

Date submitted: 28 Dec 2004 Electronic form version 1.4