Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

**Characterization of Electrical Properties of Nanowires by Electro-orientation** CEVAT AKIN, JERRY SHAN, Rutgers University — We investigate the electro-orientation of large-aspect-ratio particles in liquid suspension as a possible technique to determine the particles' electrical conductivity and/or permittivity, which are often poorly known and difficult to measure directly. With the application of a spatially uniform AC electric field, ellipsoidal particles in suspension will rotate into alignment with their longest axis along the field. In the low frequency limit, the alignment rate itself does not distinguish between equally sized particles of different properties. However, it is possible to characterize the particle's electrical properties by measuring the crossover frequency at which its alignment rate transitions from conductivity-dominated to permittivity-dominated behavior. Moreover, the crossover frequency is insensitive to the particle aspect ratio for large aspect ratios, making the electro-orientation technique suitable even for nanowires, whose precise length is difficult to resolve optically. We present experimental results obtained by optical microscopy on the alignment rate of nano- and micro- wires under applied fields of different frequency. Experiments are conducted with particles of different type and size to determine how the electro-orientation crossover frequency varies with particle conductivity and aspect ratio. We compare our experimental results with theoretically obtained values, and assess electro-orientation as a nanowire-characterization technique.

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Date submitted: 05 Aug 2011 Electronic form version 1.4