Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Decorated Rods: Novel Self-Assembled DNA Nanoparticles for Gene Delivery** JASON DEROUCHEY, Dept. of Physics, LMU-Muenchen, GREG WALKER, ERNST WAGNER, Dept. of Pharmaceutical Biology, LMU-Muenchen, JOACHIM RÄDLER, Dept. of Physics, LMU-Muenchen — The complexation of linear DNA fragments with cationic diblock copolymers was studied as a model system for understanding "bottom-up" self-assembly of nanoscopic gene delivery systems. Fluorescence correlation spectroscopy (FCS) measurements were performed on monodisperse linear DNA fragments complexed with diblock copolymers consisting of a cationic charged moiety, branched polyethyleneimine (bPEI), of 2, 10 or 25kDa, and a neutral shielding moiety, poly(ethylene glycol) (PEG, 20kDa). For 10 and 25kDa bPEI-PEG diblocks, severe aggregation is observed despite the presence of the shielding PEG. By decreasing the bPEI length to 2 kDa, or conversely increasing the number of chains per DNA, controlled nanoparticle formation is observed. The resulting decorated particles are consistent with a core-shell particle consisting of a single DNA surrounded by a brush layer of densely packed PEG chains. Diffusion coefficients for both DNA and decorated DNA fragments were measured as a function of DNA length ranging from 75 to 1018 bp and are well described by a diffusing rod model. Decorated rod DNA nanoparticles showed high stability against both NaCl salt and bovine serum albumin and are of potential interest for gene delivery of short antisense DNA or siRNA.

Jason DeRouchey
LMU-Muenchen

Date submitted: 18 Jan 2005 Electronic form version 1.4