## Abstract Submitted for the MAR06 Meeting of The American Physical Society

Evidence for High Conductivity in the Pili of Geobacter sulfurreducens: "Nano-wires" in a Prokaryotic Electron Transport Chain?<sup>1</sup> KEVIN D. MCCARTHY, Dept. of Physics and Dept. of Microbiology, UMass, GEMMA REGUERA, TEENA MEHTA, JULIE S. NICOLL, Dept. of Microbiology, UMass, XINYU WANG, Dept. of Phyics, UMass, MARK T. TUOMINEN<sup>2</sup>, DEREK R. LOVLEY, Dept. of Microbiology and The Geobacter Project, UMass — We discuss results of Conducting-Probe Atomic Force Microscopy (CP-AFM) applied to the nanoscopic filamentary pili of the prokaryote Geobacter sulfurreducens. (G. Reguera, et al., Nature 435, 1038, 2005) The apparently high cross-axis conductivity of this bacterial membrane protein complex, along with evidence of its necessity for respiratory reduction of insoluble Fe(III) deposits in nature, points to the possibility of a novel role for the pili protein complex in the electron transport chain of a prokaryote: as a kind of "nano-wire" for conduction of electrons to Fe(III) oxides. CP-AFM and *in vivo* genetic engineering experiments supporting the "nano-wire" hypothesis are presented.

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