Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Bacterial turbulence in motion ROBERTO RUSCONI, STEVEN SMRIGA, ROMAN STOCKER, Massachusetts Institute of Technology, Cambridge, MA, ELEONORA SECCHI, STEFANO BUZZACCARO, ROBERTO PIAZZA, Politecnico di Milano, Italy — Dense suspensions of motile bacteria exhibit collective dynamics akin to those observed in classic, high Reynolds number turbulence, yet this analogy has remained largely qualitative. Here we present experiments in which a dense suspension of *Bacillus subtilis* bacteria was flown through narrow microchannels and the velocity statistics of the flowing suspension were accurately quantified with a recently developed velocimetry technique. This revealed a robust intermittency phenomenon, whereby the average velocity profile of the flowing suspension oscillated between a plug-like flow and a parabolic flow. This intermittency is a hallmark of classic turbulence and was associated with the presence of collective structures in the suspension. Furthermore, quantification of the Reynolds stress profile revealed a direct link between the turbulent nature of the suspension and its anomalous viscosity.

Roberto Rusconi
Massachusetts Institute of Technology, Cambridge, MA

Date submitted: 31 Jul 2014 Electronic form version 1.4