Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Wall roughness induces asymptotic ultimate turbulence[1] RUBEN A. VERSCHOOF, XIAOJUE ZHU, DENNIS BAKHUIS, SANDER G. HUISMAN, University of Twente, ROBERTO VERZICCO, University of Rome 'Tor Vergata', CHAO SUN, Tsinghua University, DETLEF LOHSE, University of Twente — For real-world applications of wall-bounded turbulence, the underlying surfaces are virtually always rough; yet understanding the effects of wall roughness for turbulence remains a challenge. By combining experiments and numerical simulations, here, taking as example the paradigmatic Taylor-Couette system (the closed flow between two independently rotating coaxial cylinders), we uncover the mechanism that causes the considerable enhancement of the overall transport properties by wall roughness. If both walls are rough, the viscosity dependence is thoroughly eliminated and we thus achieve what we call *asymptotic ultimate turbulence*, i.e. the upper limit of transport, whose existence had been predicted by Robert Kraichnan in 1962 (Phys. Fluids **5**, 1374 (1962)).

[1]We acknowledge support from the Dutch science organisation NWO

Ruben A. Verschoof
University of Twente

Date submitted: 19 Jul 2017 Electronic form version 1.4