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Response of turbulent pipe flow experiencing a rough-to-smooth step change ALEXANDER SMITS, TYLER VAN BUREN, LEO HELLSTRM, Princeton University — In this study, we consider fully-developed turbulent pipe flow (Re_D =131000) subject to a step change in surface roughness, specifically a step change from rough to smooth. Velocity field measurements were taken downstream at (x-x_0)/D=0, 0.33, 1, 2, 4, 8, and 16 (x_0 =3.3D), using stereoscopic particle image velocimetry. We examine the downstream development of the relaxation of turbulence statistics including the Reynolds stresses, and explore how the change in roughness affects the large scale motions and the transfer of energy between scales. Supported under ONR Grant N00014-15-1-2402, Program Manager/Director Thomas Fu.

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