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Edge electrospinning: a facile needle-less approach to realize scaled up production of quality nanofibers[1] J.R. BOCHINSKI, C. CURTIS, M.P. ROMAN, L.I. CLARKE, Department of Physics, North Carolina State University, Raleigh, NC USA, Q. WANG, N.M. THOPPEY, R.E. GORGA, Fiber and Polymer Science Program, North Carolina State University, Raleigh, NC USA — Utilizing unconfined polymer fluids (e.g., from solution or melt), edge electrospinning [1] provides a straightforward approach for scaled up production of high quality nanofibers through the formation of many parallel jets. From simple geometries (using solution contained within a sharp-edged bowl [2,3] or on a flat plate [4]), jets form and spontaneously re-arrange on the fluid surface near the edge. Using appropriate control of the electric field induced feed rate, comparable per jet fabrication as traditional single-needle electrospinning can be realized, resulting in nanofibers with similar diameters, diameter distribution, and collected mat porosity. The presence of multiple jets proportionally enhances the production rate of the system, with minimal experimental complexity and without the possibility of clogging. Extending this needle-less approach to commercial polyethylene polymers, micron scale fibers can be melt electrospun using a similar apparatus. [1] N. M. Thoppey et al., *Polymer* **51**, 4928 (2010). [2] N. M. Thoppey et al., *Nanotechnology* **22**, 345301 (2011). [3] N. M. Thoppey et al., *Macromolecules* **45**, 6527 (2012). [4] M. P. Roman et al., *Macromolecules* **46**, 7352 (2013).

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