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Phase behavior of semidilute polyelectrolyte mixtures of F-actin and DNA JOHN BUTLER, Department of Materials Science, Univeristy of Illinois at Urbana Champaign, OLENA V. ZRIBI, Department of Physics, University of Illinois at Urbana Champaign, GERARD C. L. WONG, Department of Materials Science and Engineering, Department of Physics, Department of Bioengineering, University of Illinois at Urbana Champaign, RAMIN GOLASTANIAN, Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, Institute for Advanced Studies in Basic Sciences, Zanjan, Iran — We investigate the phase behavior of semidilute mixtures of polyelectrolyte DNA coils and F-actin rods. F-actin has a persistence length of ∼10 microns and a linear charge density of -1e/0.25nm. DNA has a persistence length of ∼50nm and a linear charge density of –1e/0.17nm. Confocal and polarized microscopy data show that actin-DNA phase separates into ribbon-like birefringent domains of nematic F-actin and a disordered mesh of DNA coils. Synchrotron Small Angle X-ray Scattering (SAXS) show that DNA compresses F-actin into an ultradense dense nematic phase. The spacing between nematic F-actin domains shows a power-law dependence on DNA concentration which is independent of the contour lenth of either DNA or F-actin.

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