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**Phase behaviour of a diblock copolymer melt under cylindrical confinement** WEIHUA LI, ROBERT WICKHAM, Department of Physics, St. Francis Xavier University, Antigonish, Nova Scotia, Canada — The phase behaviour of a diblock copolymer melt confined inside an infinitely-long cylindrical pore of radius $R$ is investigated using real-space self-consistent mean-field theory. A short-range, preferential interaction between the walls of the pore and one of the copolymer blocks is assumed. Confinement leads to a rich phase diagram, which is explored in detail for fixed $R = 8.5R_g$, as a function of $\chi N$ and $f$. Disordered, lamellar and cylindrical morphologies are obtained, but with arrangements and symmetries not seen in the bulk, for example: onion-like lamellar layering, arrays of cylinders symmetric under 3-, 4- and 5-fold rotations, and structures intermediate between cylinders and lamellae. Near the pore walls the structural rearrangement is severe, leading to the presence of defects in the cylindrical order. Phase transitions as the pore radius varies have also been observed.

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