

Abstract Submitted
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Bundle Buckling and Nesting Model of Striated Pattern Formation in Microtubule Solutions¹ YONGXING GUO, YIFENG LIU, JAMES VALLES, JAY TANG, Department of Physics, Brown University — Microtubules that are aligned by magnetic field or flow during the initial stages of polymerization form bundles in high concentration tubulin solutions. These bundles thicken and elongate with time and buckle in coordination with their neighbors into a wave shape. These nested and buckled bundles produce a macroscopically striped pattern of birefringence. We propose a mechanism for the buckling and present a normal mode stability analysis of a simplified model of it. The results show that the characteristic wavelength and critical buckling force are determined by the properties of the bundles and their neighboring elastic network, which is formed by unaligned and relatively short Microtubules.

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