

THE EFFECT OF ANGLE RESTRICTION ON THE
TOPOLOGICAL CHARACTERISTICS OF
MINICIRCLE NETWORKS

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Abstract

Networks of topologically linked minicircle polymers are found in diverse natural systems and are a subject of intense research in nanotechnology. In a recent report the authors introduced a new theoretical model to study the effects of polymer density on the formation and on the topological properties of minicircle networks. Three key topological characteristics were identified in the formation and characterization of a network: the critical percolation density, the average saturation density and the mean valence of the network. In this work we report how these characteristics change when an orientation bias is imposed on the minicircles forming the network. We observe that such restrictions have significant effects on the key topological characteristics of the network. In particular while the effects of restriction of the tilting angle can be predicted we find that those of the azimuthal angle can have somewhat unexpected results.