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Title:	Stabilization of overlapping biofilaments by passive crosslinkers
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Abstract:	The formation, maintenance and reorganization of the cytoskeletal filament network is essential for a number of cellular processes. While the crucial role played by active forces generated by motor proteins has been studied extensively, only recently the importance of passive forces exerted by non-enzymatic crosslinkers has been realized. The interplay between active and passive proteins manifests itself, e.g., during cell division, where the spindle structure formed by overlapping microtubules is subject to both active sliding forces generated by crosslinking motor proteins and passive forces exerted by passive crosslinkers, such as Ase1 and PRC1. We propose a minimal model to describe the stability behaviour of a pair of anti-parallel overlapping microtubules resulting from the competition between active motors and passive crosslinkers. We obtain the stability diagram which characterizes the formation of stable overlap of the microtubule pair, identify the controlling biological parameters which determine their stability, and study the impact of mutual interactions between motors and passive crosslinkers on the stability of these overlapping filaments.
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