

# **Self-organisation of expanding versus contracting microtubule networks with mitotic motors**

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During cell division, bipolar spindle assembly requires the activities of antagonistic molecular motors that crosslink and slide dynamic microtubules. The design principles of motor-mediated spindle assembly are still not understood. Previous *in vitro* reconstitution experiments have shown that microtubule-crosslinking motors can arrange microtubules either into asters, reminiscent of spindle poles, or, in the presence of crowding agents, into active gels made of extending bundles of microtubules. Using *in vitro* experiments and computer simulations, we explore here systematically the possible morphological organisations accessible with dynamic microtubules and plus or minus-end directed mitotic motors, under different nucleation conditions. Our results help us to gain insight into the molecular design principles of motor-microtubule self-organisation and into the function of antagonistic motors during spindle assembly.