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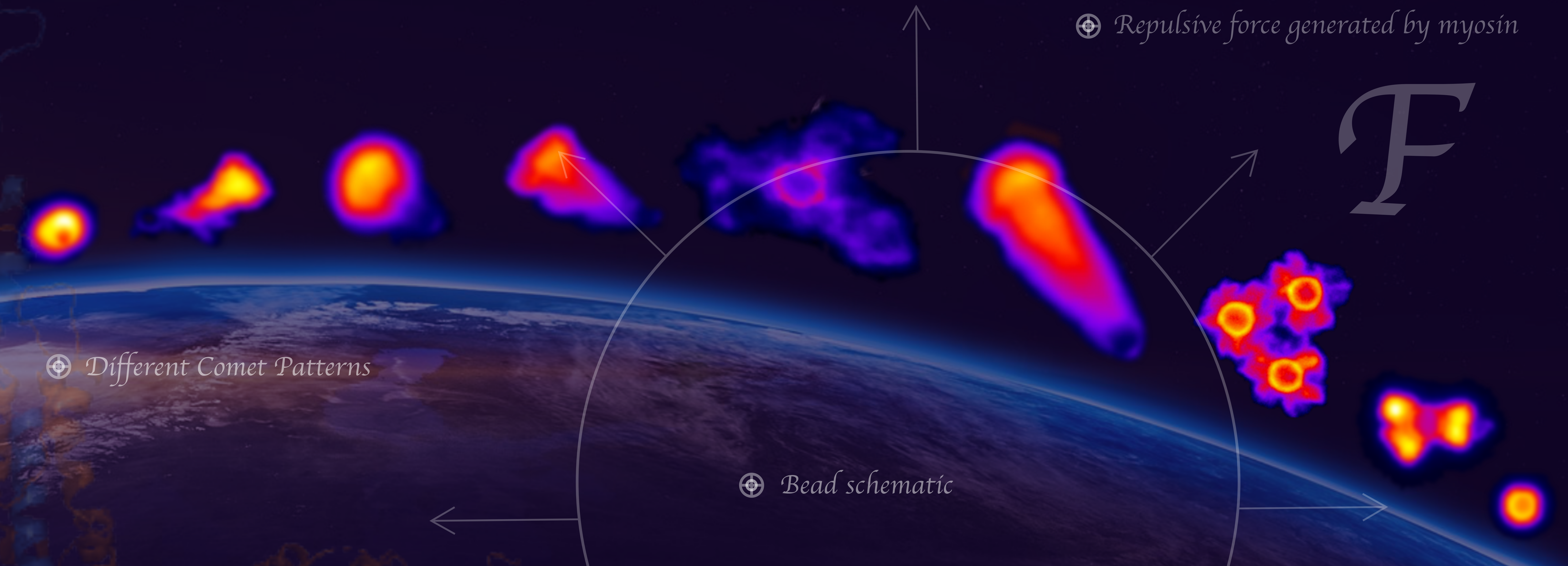

MODULATED BY TYPE-I MYOSIN

ACTIN COMET TAIL

Actin and myosin are molecular machines that convert free energy released from ATP hydrolysis into mechanical force. Polymerizing actin filaments generate force that powers membrane deformation and drives many important cellular processes. A fundamental question is how do forces from actin polymerization and myosin motor activity cooperate within these functions? To address this question, we reconstituted a 'comet tail' motility system where actin is assembled from beads coated also with myosin-I to examine the resulting emergent properties. This setup mimics actomyosin organization in many membrane-associated cellular contexts, allowing us to precisely control the exact composition of the constituent components and dissect the underlying mechanisms. We find that myosin-I regulates the dynamics and architecture of the actin comet tails through its force-generating power strokes directed to actin's fast growing barbed (+) end, which generates an effective repulsive force from the bead surface. These findings have important implications in how myosins contribute to numerous fundamental cellular processes relying on actin-based motility.