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**Theory of polymorphic transformations of flagella**

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Bacterial flagellar filaments can abruptly change shape in response to mechanical load or changes in solution pH or ionic strength. These polymorphic transformations are an instance of a ubiquitous phenomenon, the spread of conformational change in large macromolecular assemblies. We propose a new theory for polymorphism, whose essential elements are two molecular switches, an elastic mismatch strain between the inner and outer cores of the filament, and cooperative interactions between neighboring subunits on the same protofilament. We calculate the phase diagram for helical and straight states, and the response of a helical filament to an external moment.