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## **Torque and longitudinal force exerted by eigenmodes on circular waveguides**

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It is demonstrated that rotating waveguide eigenmodes may exert a longitudinal force, positive or negative, as well as a torque on the guiding structure itself or part of it. Configurations that are considered include a lossy dielectric cylinder bounded by a hollow waveguide, and a lossy dielectric fiber. Both propagating and evanescent eigenmodes are considered. The analysis is based on a general formulation of the linear and angular momentum currents flowing in the waveguide. The results of this study suggest a novel type of light-driven machine.