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Levitated optomechanics with a Mie particle[1] A KANI, TUSHAR BISWAS, MISHKAT BHATTACHARYA, Rochester Institute of Technology — Mie particles are gaining interest in levitated optomechanics as they offer stronger coupling to gravitational forces compared to Rayleigh particles, as well as opportunities for testing quantum mechanics at the macroscale. We present the dynamics of an optically trapped Mie particle in free space as well as in a hollow-core photonic crystal fiber. Light is confined within the trapped particle through coupling into a whispering gallery mode (WGM). We investigate the setup geometry and particle asphericity to maximize coupling into the WGM, radiation pressure, and control over particle dynamics. The proposed model has potential applications in optomechanical cooling, sensing and matter wave interferometry.

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