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Rotation of a metal gear disk in an ultrasonic levitator PABLO L RENDON, RICARDO R BOULLOSA, CCADET, Universidad Nacional Autonoma de Mexico, LAURA SALAZAR, Facultad de Ciencias, Universidad Nacional Autonoma de Mexico — The phenomenon known as acoustic radiation pressure is well-known to be associated with the time-averaged momentum flux of an acoustic wave, and precisely because it is a time-averaged effect, it is relatively easy to observe experimentally. An ultrasonic levitator makes use of this effect to levitate small particles. Although it is a less-well studied effect, the transfer of angular momentum using acoustic waves in air or liquids has nonetheless been the subject of some recent studies. This transfer depends on the scattering and absorbing properties of the object and is achieved, typically, through the generation of acoustic vortex beams. In the present study, we examine the manner in which the acoustic standing wave located between two disks of an ultrasonic levitator in air may transfer angular momentum to objects with different shapes. In this case, a non-spherical object is subjected to, in addition to the radiation force, a torque which induces rotation. Analytical solutions for the acoustic force and torque are available, but limited to a few simple cases. In general, a finite element model must be used to obtain solutions. Thus, we develop and validate a finite element simulation in order to calculate directly the torque and radiation force.

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