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The Oscillatory Motion of a Sphere in a Stokes Flow FINN BOX, School of Physics, University of Manchester, ALICE THOMPSON, School of Mathematics, University of Manchester, TOM MULLIN, School of Physics, University of Manchester — We report results of an experimental investigation into the dynamic response of a single sphere to magnetic forcing and the resultant motion of the surrounding viscous fluid. Permanent magnets embedded into the surface of a neutrally buoyant sphere enable actuation of torsional oscillations of the sphere through the application of an alternating magnetic field. The applied field induces a torque on the embedded magnets, and the torsional response of the sphere to magnetic forcing has been systematically characterized as a function of the dimensionless forcing parameter $F=8\pi\mu\ a^3\omega$. Excellent agreement is found between the experimentally observed and numerically computed behavior of the sphere. Furthermore, the flow generated by the rotary motion of a sphere has visualized using Particle Image Velocimetry and good agreement is also found between the observed and the analytic solution for the fluid velocity as a function of radial distance.

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