Abstract Submitted
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Diamagnetic repulsion, the method of magnetic images & suitability of the solenoid and dipole models[1] MING YIN, Benedict College, Columbia, SC29204, HUAIZHOU ZHANG, TIMIR DATTA, University of South Carolina, Columbia, SC29208 — The repulsion of a permanent magnet from a diamagnetic region was investigated. A magnet of moment m can be described by two models (i) solenoid - a circulating current of appropriate value; second (ii) a magnetic dipole comprising of a pair of north and south poles of separated by a distance.The magnetic field (B) of a permanent magnet was measured. The magnet was modeled as a solenoid with a circulating surface current. The Biot-Savart law field (B) was of computed in Matlab. The experimental data of was in excellent agreement with the Matlab results. However, for computing the repulsion force (F) between the magnet and its diamagnetic image by the direct integration of the current-current interaction require detailed knowledge of the two current densities. However such knowledge is not essential if image is modeled as a dipole. When the magnet is a distance z above the diamagnetic interface then the image current I2 gives rise to a image dipole m2 and the F $\sim$ m2div B, where the div of the holding field is computed at the distance 2z below the magnet. In this model F is directly proportional to both m' and the derivative of the field and a negative slope indicates repulsion, all three were confirmed.

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