

Magnetic Torque in a Spherical Pendulum

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The torque produced by placing a magnetic dipole in a magnetic field is useful in many physical experiments and applications such as motors or experiments that make use of precessions around a magnetic moment. As such, knowing a system's magnetic moment is vital. Calculating the magnetic moment can be done in various ways, such as measuring the displacement of a magnetic on a spring placed in a nonuniform magnetic field created by Helmholtz coils. In this experiment, however, the magnetic moment of the Helmholtz coils was calculated by measuring how long it takes for a cue ball with a magnetic dipole placed inside to oscillate in a uniform magnetic field created by the coils. The magnetic moment was measured to be $\mu = .47 \pm .01Am^2$, which is closely consistent with the literature value of $\mu = .40 \pm .01Am^2$.