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Experiments with Electrodynamic Wheels NATHAN GAUL, DANIEL COREY, VINCENT CORDREY, WALERIAN MAJEWSKI, Northern Virginia Community College, Annandale, VA — Our experiments were involving inductive magnetic levitation. A Halbach array is a system in which a series of magnets is arranged in a manner such that the magnetic field is cancelled on one side of the array while strengthening the field on the other. We constructed two circular Halbach wheels, making the strong magnetic field on the outer rim of the ring. Such system is usually dubbed as an Electrodynamic Wheel (EDW). Rotating this wheel around a horizontal axis above a flat conducting surface should induce eddy currents in said surface through the variable magnetic flux. The eddy currents produce, in turn, their own magnetic fields which interact with the magnets of the EDW. We demonstrated that these interactions produce both drag and lift forces on the EDW which can theoretically be used for lift and propulsion of the EDW. The focus of our experiments is determining how to maximize the lift-to-drag ratio by the proper choice of the induction element. We will also describe our experiments with a rotating circular Halbach array having the strong magnetic field of about 1 T on the flat side of the ring, and acting as a hovercraft.

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