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Directed Paramagnetic Colloidal Swimmers SIBANI LISA BISWAL, DI DU, Rice University, DEPT. CHEMICAL AND BIOMOLECULAR ENGINEERING TEAM — A novel micoscale swimmer can be generated by placing two paramagnetic colloids of different sizes in a rotating magnetic field. For propulsion at the microscale, viscous forces dominate over inertial forces. This results in the scallop theorem, where reversible displacements does not lead to any net motion. To achieve controlled swimming at the microscale, the swimmer must be able to make a sequence of deformations that are cyclic but not time reversible. Two paramagnetic bodies in a circular eccentric rotating magnetic field influence each other and propel together in a directed manne. The motion of each body tracks a half-moon course, shown in the figure below. We will describe this method and show how Brownian motion enhances this propulsion.

Sibani Biswal
Rice University

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