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A photolithographic fabrication technique for magnetohydrodynamic micropumps STEPHEN KUENSTNER, MARTHA-ELIZABETH BAYLOR, Physics and Astronomy Department, Carelton College — Magnetohydrodynamic (MHD) devices use perpendicular electric and magnetic fields to exert a Lorentz body force on a conducting fluid. Miniaturized MHD devices have been used to create pumps, stirrers, heat exchangers, and microfluidic networks. Compared to mechanical micropumps, MHD micropumps are appealing because they require no moving parts, which simplifies fabrication, and because they are amenable to electronic control. This abstract reports the fabrication and testing of a centimeter-scale MHD pump using a thiol-ene/methacrylate-based photopolymer and mask-based photolithographic technique. Pumps like this one could simplify the fabrication of sophisticated optofluidic devices, including liquid-core, liquid cladding (L^2) waveguides, which are usually created with PDMS using stamps, or etched into silicon wafers. The photolithographic technique demonstrated here requires only one masking step to create fluid channels with complex geometries.

Stephen Kuenstner
Carelton College

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