Scientific Achievement
Swimming of homogeneous 2D elastic sheets made from magnetic particles.

Significance and Impact
Understanding how to use a dynamic magnetic field and sheet symmetry to induce locomotion reduces the complexity of sheet synthesis and advances the design of autonomous, soft microrobots.

Research Details
– Above a critical rotation frequency for the magnetic field, traveling waves are produced around the magnetic sheet.
– Fluid flow caused by the motion of sheet with broken symmetry moves the sheet along a circular path.
– A sequence of nonreciprocal sheet motion will cause swimming along a predetermined path.
– The swimming velocity can be computed by accounting for the broken sheet symmetry.