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**Fission and fusion scenarios for magnetic microswimmer clusters** ANDREAS KAISER, Argonne National Laboratory, FRANCISCA GUZMAN-LASTRA, HARTMUT LOWEN, Heinrich Heine University Dusseldorf — Fission and fusion processes of particles clusters occur in many areas of physics and chemistry from subnuclear to astronomic length scales. Here we study fission and fusion of magnetic microswimmer clusters as governed by their hydrodynamic and dipolar interactions. Rich scenarios are found which depend crucially on whether the swimmer is a pusher or a puller. A linear magnetic chain of pullers is stable while a pusher chain shows a cascade of fission processes as the self-propulsion velocity is increased. Contrarily, magnetic ring clusters show fission for any type of swimmer. Moreover, we find a plethora of possible fusion scenarios if a single swimmer collides with a ringlike cluster and two rings spontaneously collide.

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