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EDUCATION SCIENCE INNOVATION

## Séminaire café - PMMH

Bureau d'Études, Batiment L, 2<sup>ème</sup> étage

Jeudi 19 janvier 2017, 13h30

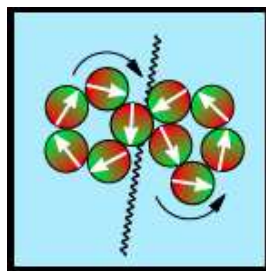
### Francisca Guzman-Lastra

Post-doctorante, Heinrich-Heine-Universität Düsseldorf

#### Fission and fusion scenarios for magnetic microswimmers clusters

Fission and fusion processes of particle clusters occur in many areas of physics and chemistry from subnuclear to astronomic length scales. Here we explore clusters of swimmers which are governed by hydrodynamic and dipolar interactions and classify the rich scenarios of their fission and fusion processes. These scenarios are found that depend crucially on whether the swimmer is a pusher or a puller. In particular 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. Our predictions are verifiable in magnetotactic bacteria and synthetic self-propelled magnetic Janus particles [1].

[1] F. Guzman-Lastra, A. Kaiser, H. Löwen, *Fission and fusion scenarios for magnetic microswimmer clusters*, Nature Communications **7**, 13519 (1-10) (2016).



Two rings of pushers after collision can exchange particles and move with a complex combination of toddling and rotation.

Prochain séminaire : jeudi 02 février 2017 à 13h30,  
Marie Tani, post-doctorante au PMMH

Programme des séminaires café : <https://www.pmmh.espci.fr/?-Seminaire-Cafe-Interne->  
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