

Colloquium Thermo- and Fluid Dynamics

Electrifying Small-Scale Robots

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Magnetic micro- and nanorobots are small-scale vehicles that can move in fluid environments by means of external magnetic fields. One of the ultimate goals of magnetic small-scale robotics is to develop machines that can deliver drugs, or realize other medical missions in confined spaces of the human body. Other applications include water remediation or “on-the-fly” chemistry. The recent rapid developments in small-scale robotics are undeniably related to advances in material science and manufacturing. In this talk, we will present small-scale robots that integrate magnetoelectric building blocks for remote electrical stimulation. The micro- and nanomachines consist of multiferroic composite materials, which have the ability to generate an electric field under the application of an external magnetic field. The magnetoelectric small-scale swimmers comprise a magnetostrictive component that allows for both the magnetic locomotion of the device, and the activation of the piezoelectric component. The wirelessly activated electrical polarization can then be used for cell electrostimulation, drug delivery, or for triggering redox chemical processes.



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Time: 16:15 - 17:15h

Place: ETH Zurich, ML H 44

Host: Prof. Filippo Coletti, IFD