

Spin-Hydro - Coupling the world of Spintronics and Hydrodynamics

Initiative: "Experiment!" (beendet)

Ausschreibung: Explorative Phase

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Projekt-Website: <https://www.tu-ilmenau.de/universitaet/fakultaeten/fakultaet-maschinenbau/profil/institute-und-fachgebiete/fachgebiet-technische-thermodynamik/mikrofl>

The magnetohydrodynamic conversion of kinetic energy of fluids into electric energy is well known and applied for power generation. A recent experiment shows a similarity between the magnetic field and the spin-orbit orientation in liquid metals, which opens an completely undiscovered path for energy conversion. The unresolved question is on how does the macroscopic hydrodynamic world couple with the spin-orbitals on atomistic levels. The team proposes an experimental setup consisting of a large box to control the environmental conditions, a pressure vessel which is filled with the eutectic alloy Indium-Gallium-Tin (GaInSn), and a connecting capillary. When a pressure (up to 10 bar) is applied the liquid metal is pushed through a capillary into another storage vessel placed on a high precision scale to determine the mass flow rate. The potential is then measured between the electrodes at the beginning and at the end of the capillary. However, there is a need for a very good control of many parameters. If successful, the concept could alter our understanding of spintronics and our way of electric energy production completely.

Projektbeteiligte

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Open Access-Publikationen

Electric voltage by electron spin-vorticity coupling in laminar ducts
Spin hydrodynamic generation at low and high Reynolds numbers

