FZU
Institute of Physics of the Czech Academy of Sciences

SEMINAR

16. 02. 2022 | 14:00

Onsite: Přednáškový sál, Na Slovance 2, Praha 8

Online: https://webmeeting.fzu.cz/b/mus-xcv-rtu

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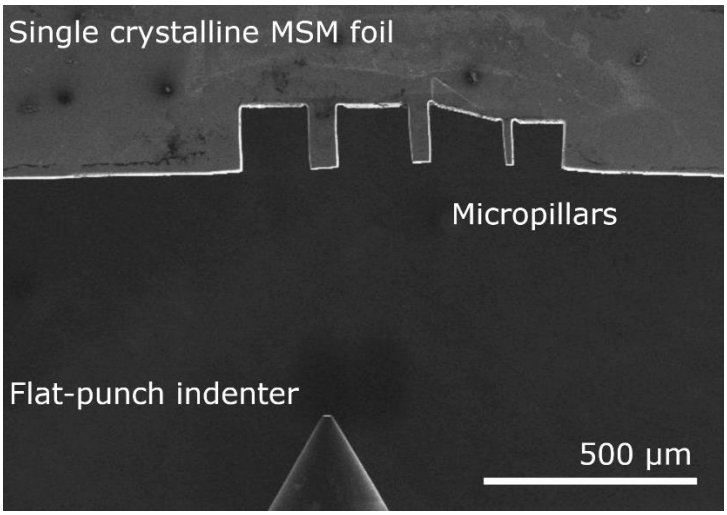
MicroMagS: Does Size Really Matter?

Size effect study in single crystalline MSM micropillars

Magnetic shape memory (MSM) alloys are known for their large shape change in the magnetic field. After the magnetic field is removed, the material retains its shape. Within MicroMagS project I attempt to advance the MSM applications towards the actuation on micro- and nanoscale. This will allow for significant increase of the operating frequency of such micro-magneto-mechanical systems (M^3S).

Three micropillars of diminishing cross-sections were focused-ion-beam (FIB) machined in 50μm thick single crystalline Ni-Mn-Ha foil prepared by mechanical grinding. The foil with machined micropillars was subjected to pulse electrochemical etching, which allowed to remove 3 to 5 μm of surface layer that was damaged during FIB machining. Stress-free micropillars (60, 40 and 20 m wide) were mechanically tested in compression by using a Hysitron PI 85 SEM PicoIndenter inside a FEI Quanta 3D FEG Dual Beam SEM. Here I present how micropillar size affects the twinning stress and possibility of magnetic actuation in micro-structured MSM single crystal.



SEM image of a set of micropillars FIB-milled in the 50 μm thick Ni-Mn-Ga foil and a flat-punch indenter after performing mechanical compression tests.

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