

NOMATEN HYBRID-JUNIOR-SEMINAR

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In-person: NOMATEN seminar room, NCBJ.

Monday, NOVEMBER 21st 2022 13:00 (1.00PM CET)

Optimisation and microstructural characterisation of parts 3D-printed on MARS-M

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Abstract:

Though much has been improved in the design of bulk metallic glasses since the 1960s, parts are still usually produced by casting, limiting their size to a few millimetres to centimetres in thickness due to falling cooling rates and increasing crystallisation when increasing casting diameter. This limitation has been the greatest impediment to the use of BMGs as structural parts and tools, despite their advantageous properties. Only recently have these materials been used within the context of 3D-printing, as this process was revealed to allow circumventing of these size limitations: by printing layer by glassy layer, it is possible to form a larger amorphous part. Meanwhile, 3D-printing of metals has been greatly advanced in the last few years, yet some points remain to be explored for its use in space, such as the effect of microgravity on metal melt dynamics, and so on the printing process itself. This is where MARS-M comes in: Metal-based Additive manufacturing for Research in Space. The sounding rocket payload device was created by the Institute for Materials Physics in Space, DLR, and is able to perform laser powder bed fusion in reduced or micro-gravity.

Bio:

Born in France of British-French parents. Studied mechanical engineering at the National Institute for Applied Sciences (INSA) in Rouen, Normandie (France), then did a master's in materials and production sciences at the University in Kaiserslautern (TU KL, Germany). Worked 2 years in LBM, NCBJ, on nanoindentation of ferritic-martensitic steels. Since August 2020 working on 3D-printing of metallic glasses in microgravity at the DLR (German Aerospace Centre) in Cologne (Germany).