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## An innovative testing machine for heating, quenching, tension, compression and cracking studies of industrial relevant high-temperature alloys -HiMat BMBF project

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The development of new high temperature superalloys for aircraft engines and stationary gas turbines in power engineering requires higher service temperatures to enhance efficiency and reduce CO2 emissions. The development of these new materials require the structural (phase transformation) and mechanical (hardness) studies of strengthening and high temperature phases, precipitation kinetics (growth & dissolution), creep & crack growth and forging processes. This will include the development of a new testing machine for neutron scattering studies able to reproduce the rotation or forging forces at high T of a gas turbine which means tension and compression possibilities (up to 100 kN) and furnace heating (up to 1200  $^{\circ}$ C). In the HiMat project, we will focus not only on the development of the testing machine but also on the study

- of different new high temperature superalloys:
   Fundamental studies (strengthening, phase stability…) on new developed Co-base superalloys (materials developed by FAU).
- Industrial studies (understanding of forging, creep resistance..) on VDM Ni-base superalloys (material developed by VDM Metals).

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