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Neutron imaging applications for energy research

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Neutron imaging is a valuable tool for non-destructive testing of a huge variety of samples. The high sensitivity of cold neutrons for light elements such as H and Li combined with a good penetration of many metals may provide complimentary information to standard x-ray or synchrotron CT. Particularly in energy production and -storage the materials mentioned above are frequently employed. This renders imaging with cold neutrons an ideal technique for the study of static and dynamic processes in batteries, fuels cells and hydrogen storage materials. Examples include the transport of electrolyte in batteries, water management in fuel cells and hydrogen uptake in hydrogen storage tanks.

Furthermore, MLZ operates a unique imaging facility employing fission neutrons which show much higher penetration for heavy elements while still being sensitive for light elements as hydrogen. This is particularly beneficial for the investigation of massive hydrogen storage tanks which are needed to sustain high pressures at high temperatures.

In our presentation we will give an overview of the two neutron imaging instruments ANTARES (cold neutrons) and NECTAR (fast neutrons) operated at MLZ and show typical applications of neutron radiography and tomography for energy related research.

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