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The Low Flux Neutron Source AKR-2

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Abstract
In 1990, 7 research reactors have been in operation in Germany for the field of neutron science (FRM I, RFR, FRG-1, FRJ2, FRG-2, FMRB, BER II). Since that time, five facilities have been decommissioned with one more to be closed by the end of 2019 (BER II). In 2020, only 1 research reactor (FRM II) will be in operation in Germany to produce neutrons for neutron science. Because of this radical reduction of neutron sources in Germany it becomes more and more difficult to train staff and to optimize instruments and methods employed in neutron science. The same applies for finding motivated students. To guarantee competence in Germany in the field of neutron science for the future, it is indispensable to get in touch with students and to raise the awareness of neutron sources close to universities. The zero-power campus reactor AKR-2 at the TU Dresden fulfills this task.

The training and research reactor AKR-2 is a thermal, homogeneous, solid material moderated zero power reactor with maximum permanent power of 2 Watt. AKR-2 was completely refurbished in 2005 and is actually the most advanced zero power training reactor in Germany. The facility is equipped with a state-of-the-art digital I&C control system Teleperm XS (see also http://tu-dresden.de/mw/akr). The main purpose of AKR-2 and its design basis was and is the education of students in nuclear and reactor physics, in nuclear engineering as well as to teach fundamental knowledge in radiation protection. Due to the physical characteristics of AKR-2, research is limited to projects where low neutron fluxes are desirable and variable operational conditions as well as low costs are requested. The access to AKR-2 is uncomplicated and there is no proposal reviewing system. While at high flux facilities high level and well recognized research is carried out, AKR-2 is ideal for idea, test and quick trial experiments. There are a couple of experimental channels enabling flexible access to the neutron field. In the presentation, we will give a detailed description of the AKR-2's design and its physical properties. Some selected results of neutron imaging with thermal neutrons which was performed for the first time at AKR-2 will be shown. Furthermore, we would like to discuss the question how the AKR-2 can contribute in the education of scientists dealing with neutron scattering methods in future?

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