Radiation safety aspects of the user-orientated research at the Budapest Neutron Centre

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The Budapest Research Reactor (BRR) is the leading research infrastructure in Hungary, and one of the largest in Central-Europe. Scientists at BRR have decades of tradition in using neutron beams for neutron scattering, as well as neutron-based element analysis and imaging. BRR, a VVR-type (water-cooled, water-moderated) nuclear reactor, started its operation in 1959. After three stages of refurbishment, the 10 MW thermal power reactor is a reliable neutron source for beamline experiments and material irradiation. Since 2000, a Cold Neutron Source is in operation to provide cold neutrons for neutron-guide-based experimental stations, too.

The reactor is operated by the Centre for Energy Research. The Budapest Neutron Centre (BNC) consortium was formed in 1993, with the participation of the neutron-research-related laboratories on the campus. 16 stations around the BRR offer experimental techniques for the scientists of national and international projects. From the beginning of the 2000s, BNC participates in European framework programs to offer trans-national access for researchers of various disciplines. We also offer a significant part of our capacity to industry-related research.

At every experimental station of the BRR, radiation safety regulations are of the highest priority. The national regulations are following the international recommendations (by the IAEA, ICRP, EURATOM). In this presentation, we give an overview of the general radiation safety issues related to employees and users, who work with ionizing radiation and take part in experiments. Some specific features at the PGAA, RAD and NAA laboratories will be shown, too.

Besides the protection of the employees and visitors, it is also important to protect the integrity of the investigated samples, especially when we study valuable pieces, such as a cultural heritage object. We discuss the risk of activation and other visible or non-visible damage, when using various neutron-based methods, and will show how safe is the use of neutron-based methods in the vast majority of the situations.