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Upgrade of the prompt-γ activation analysis (PGAA) and neutron induced prompt-γ spectroscopy (NIPS) facilities of the Budapest research reactor

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The Prompt-Gamma Activation Analysis (PGAA) and the Neutron Induced Prompt-gamma Spectroscopy (NIPS) facilities are located at the end of the guided beamline No.1. of the Budapest Research Reactor. In the last few years they were significantly upgraded. The partial replacement and realignment of the neutron guide elements resulted in a factor of four gain of the neutron flux. To make possible the unattended and independent operation of the two stations, a neutron flux monitor and computer-controlled beam shutters have been put into operation. This latter can be programmed to open and close the neutron beam according to a predefined time sequence, thus it will be an ideal tool to perform in-beam activation experiments.

In order to make the PGAA facility even more productive, an automatic sample changer has been designed and manufactured. This can accommodate 16 samples, either solids, powders in sealed Teflon bags, or liquids in vials. A computer program has been developed to control such batch runs.

At the NIPS station, however, more attention is paid to the non-destructive analysis of bulky samples. Therefore a new, bigger and partially dismountable sample chamber is under construction. Moreover, the detection conditions are substantially improved by the installation of a new BGO Compton suppressor and massive lead shielding. Space is reserved for a moving table and for a neutron tomograph, to re-establish the combined Prompt-Gamma Activation Imaging (PGAI) and Neutron Tomography (NT) equipment.

The upgraded facilities offer new possibilities for the routine element analysis and also for the cutting-edge research challenges, and continue to serve international collaborations within the EU FP7 and many other projects.

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