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Prompt Gamma Activation Analysis and In-Beam Activation Analysis at FRM II

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The high-flux cold neutron beam at the Prompt Gamma Activation Analysis (PGAA) facility at Garching makes possible plenty of new applications, which were impossible earlier when using this technique. The thermal equivalent neutron flux in the focal point is $6 \times 10^{10} \text{ cm}^{-2} \text{ s}^{-1}$, which almost reaches the flux of smaller reactors, but in a beam which is totally free of epithermal or fast neutrons. The sample masses can now be below 1mg, or materials with extremely low cross section (such as deuterium [0.5 mb], oxygen [0.2mb], or even gaseous neon [39mb]) can be measured with good statistics. In this beam, even radioactive samples can be irradiated whose induced activity was found to be too low to compete with the natural activity. Moreover, in-beam neutron activation analysis (NAA) can also be performed. This method can be combined with PGAA, significantly increasing the number of detectable elements. In the talk, the methodological developments and the most important applications will be summarized.

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