Report on the work of the measurement and data-analysis teams and on the current status of the preparation of experiments at future neutron sources

This report corresponds to the actions that were planned in task 3 "Nucleosynthesis in Neutron Capture Processes" of ATHENA. As already mentioned in the scientific report of the first reporting period as a corrective action, the aims of this task have changed significantly. Instead of supporting experimental campaigns at the n_TOF facility at CERN, Switzerland, and the following data analysis by funding the travel costs of young researchers, it turned out that the community would benefit more from a workshop or conference organized in collaboration with LANSCE, Los Alamos National Laboratory, U.S.A., where complementary experiments are performed.

This workshop on "Prospects in neutron time of flight" took place at the conference centre Darmstadtium in Darmstadt, Germany, from March 18th to 20th, 2013. In total, 27 participants from seven European countries, from Japan and from the U.S.A. were present. The program consisted of twelve invited overview talks (45 minutes plus 15 minutes discussion) and ten contributed talks (25 minutes plus 5 minutes discussion). Neutron facilities in Europe and the U.S.A. were presented and new developments in detector technology and for data acquisition were discussed.

The workshop brought together scientists with experience in the field of measurements of neutron-induced reactions applying the time-of-flight technique and enforced new collaborations. One of the major ideas is to develop a new kind of detector using either a combination of high-resolution detectors (e.g. semiconductor detectors) and high-efficiency detectors (e.g. scintillator detectors) or lately developed and now commonly available detectors such as LaBr detectors. The mandatory simulations will be carried out in collaboration of the present institutes and – if possible – the following purchase of the optimized system will be shared, too. This work will be accompanied by developments for digital data acquisition systems.

Thus, the outcome of the workshop fulfilled the corrected aims of task 3 "Nucleosynthesis in Neutron Capture Processes" of ATHENA.