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Schwerpunkt / main research area	Materie / Matter
FE-Vorhaben / RD project	**M05 Betrieb und Weiterentwicklung der Neutronenquelle FRJ-2**
Institutsbeitrag / institute's contribution	52105 Zentralinstitut für Elektronik / Central Institute for Electronics (ZEL)
Verantwortlich / in charge	Prof. Dr. Horst Halling H.Halling@fz-juelich.de
HGF-Forschungsbereich / Research Field	*Structure of Matter*
HGF-Programm / Programme	***Large Scale Facilities for Research with Photons, Neutrons and Ions***
HGF-Thema / Topic	*Neutrons*
Internet	www.fz-juelich.de/scientific-report

Detailergebnisse / Details

Method development and implemention of control and data acquisition systems for neutron scattering experiments

The unification of neutron scattering experiment electronics and software at FRJII was improved further, based on a common framework developed together with the instrumentation group of the FRMII in Garching ("Jülich-Munich-Standard"). The control systems of the experiments DNS and KWS3 have been designed and have already partly been implemented according to this framework. The experiments SV29, HADAS, KWS-1 and KWS-3 have been further extended and optimized. The essential parts of the control system of SV30 have been implemented. In all experiments the high degree of modularity lead to professional solutions using industrial process periphery extensively. Productivity was increased because the modular design allowed the reuse of many developed components.

All new experiment control systems are designed as distributed client-server systems, based on the middleware system TACO. A key issue is the consequent use of industrial control technology, leading to cost efficient solutions with improved robustness, standardization, scalability and long term availability. With the integration of the scripting language python a powerful tool has been provided to the experimentator, that allows the dynamic creation of new experiment scenarios. The implementation of mobile operator panels with powerful GUI and wireless LAN lead to a major productivity increase during commissioning and service. The Actuator-Sensor-Interface (ASi) was evalutated successfully as an alternative approach for connecting simple peripheral devices. ASi is a cheap and robust technology with drastically reduced installation effort. Developments covering component-based automation (PROFInet) and Internet access to PLCs and decentral periphery were started.

Detector technology

Work in the field of detector systems was related to the detectors of the small angle neutron scattering instruments KWS-1 and KWS-2. At KWS-1, final activities for the use of the new detector in standard operation were carried out and its detection properties had been determined by measurements. Compared to the old detector, the new detector has a clearly better linearity and spatial resolution. By usage of the new readout electronics, the dead time of the detector was reduced to 4.5 μs (old detector: 9.2 μs), which allows for considerable higher counting rates. Work for KWS-2 aimed at the intended upgrade of the instrument in 2004, where the currently used gas detector should be replaced by a new detector with an identical construction as at KWS-1. The components for the new detector and readout electronics had been tested and assembled.