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Professional simulations of neutron spectrometers and experiments by VITESS software package

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At present days practically each new neutron spectrometer before construction or modernization is simulated, and its parameters are optimized with use of calculations on fast modern computers. In several leading world neutron centers development new and support of old program packages (MCSTAS, VITESS, RESTRAX, NISP) with use of a method of Monte Carlo is conducted. In FLNP modules for simulations of neutron spectrometers and virtual experiments for the VITESS program (Virtual Instrument Tool for European Spallation Source) are developed, tested and used. Development of nearly a half of all code (and according to modules) is over the last 10 years successfully complete VITESS in close cooperation with Juelich Centre of Neutron Science (FZ-Juelich Germany) in Munich. In particular, tasks of modeling of neutron instruments with the polarized neutrons are almost completely realized today. A simulation of various flippers and spin echo spectrometers with constants and time dependent magnetic fields is carried successfully out. Thus magnetic fields can be as model (are incorporated in the modules) and/or calculated by the external special software (for example MagNet, Ansys, etc.).

Summary

Practically all neutron optical devices and elements existing today were included in VITESS (and are successfully simulated): neutron guides, benders, neutron mirrors, lenses, prisms and their combinations. Possibility of modeling of neutron detectors (including position sensitive detectors PSD) with time focusing is included in the VITESS program. This is original difference of the VITESS software package from the other packages. In process of emergence of new tasks, new universal modules are added into VITESS software, and also modified old ones for future projects and tasks.

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