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The small angle neutron scattering instrument KWS1

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Small angle scattering (SAS) is a widely used tool to address the nano-scale. It can be used for soft matter science, i.e. colloids, complex fluids, polymers, nanocomposites, proteins and protein complexes, and finally also in food science. But also in the field of materials, f.i. steels and alloys, it can be useful. When using polarized neutrons with/without polarization analysis, even more information can be obtained for steels and other magnetic materials. Finally, the grazing incidence geometry reveals detailed information about near-surface structures and hidden layers, be it non-magnetic or magnetic.

There are many attempts to support the data analysis and the interpretation using artificial intelligence (AI). This may lead to the choice of a correct theoretical model that then may be fitted using Bayesian statistics to obtain a statistically relevant statement about the original sample system. Also the scanning of a given parameter space (concentration, temperature, pressure, or other external fields) may support the quick parsing of a phase-diagram-like map without too many useless datapoints in the middle of an already characterized 'phase'. Basically, there are no limits to applications of AI combined with SAS.

In this contribution I present the instrument KWS1 with many technical details and a few scientific examples. The application of AI may be discussed by the interested audience and the presenter.

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