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Spin Echo Resolved Grazing Incidence Neutron Scattering. Suzanne G.E. te Velthuis, Péter Falus, Gian P. Felcher, Materials Science Div., Argonne National Laboratory, Argonne IL, USA, Alexei Vorobiev, János Major, Helmut Dosch, Max Planck Institut für Metallforschung, Stuttgart, Germany, Peter Müller-Buschbaum, Technische Univ. München, Garching, Germany.

Conventionally the spin-echo technique is used to encode energy transfer in neutron inelastic scattering experiments. However, spin-echo may encode the neutron momentum transfer, allowing the probing of large length scale structures without the need of a tight neutron beam collimation and resulting intensity loss. This concept has recently been successfully utilized for small angle scattering experiments in transmission geometry as well as scattering in the grazing incidence geometry at a reflectometer (EVA, Institut Laue-Langevin, Grenoble) equipped with neutron resonance spin echo circuits as well as appropriate neutron spin rotators. The tests included the measurement in transmission geometry of suspensions of polystyrene balls (1500 Å radius) as well as anodized aluminum oxide 2D gratings, as well as the measurement in reflection geometry of the characteristic lengths of assemblies of polystyrene droplets dewetted from a silicon surface. The results are guiding the design of an instrument for the Spallation Neutron Source capable of studying the structure and working of biological membranes.