



Contribution ID: 82

Type: **Talk (25 + 5 min)**

First results on the Wide Angle Neutron Spin Echo (WASP)

Monday 20 March 2023 14:00 (30 minutes)

The first Neutron Spin Echo (NSE) instrument, IN11, was in user operation for 40 years. The newest spin echo instrument WASP took the relay and just had its first full year of user operation. I will use this occasion to review how the design of the wide angle NSE spectrometers has developed over the years.

Apart from WASP, all non-resonant Neutron Spin Echo spectrometers use the basic IN11A design where the precession field is generated by long solenoids along the neutron beam. This construction limits the angular detector coverage and count rate of the instruments. Last century there have been two attempts to make a wide-angle coverage neutron spin echo instrument. IN11C at ILL was equipped with a flattened solenoid downstream of the sample and it had a 30 degree-wide angular coverage. The SPAN instrument[1] at HZB used a pair of coils in the anti-Helmholtz configuration creating an azimuthally symmetric magnetic field, which, in theory, could allow a nearly 360 degree detector coverage. WASP uses an improved SPAN construction, and it aims to have a 500 times higher detected intensity than IN11A while the resolution remains the same.

The long construction has finished in 2018, and the instrument has seen 4 full cycles of user operation. The detailed characteristics of the instrument and the first scientific results[2-4] will be presented.

References

- [1] C Pappas et al., Physica B: Condensed Matter, 283, 365-371 (2000).
- [2] P Luo et al. Nature Communications, 13, 2092 (2022)
- [3] H Frielinghaus et al., Frontiers in Physics, 10, 872616 (2022)
- [4] F Lundin et al., J. Phys. Chem. C, 126, 16262–16271 (2022)

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Session Classification: Spectroscopy

Track Classification: Neutron Instrumentation, Optics, Sample Environment, Detectors, and Software