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Spectroscopy Requirements For New Neutron Sources

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In the recent past and at the present time, new ideas and concepts have emerged for new types of neutron sources and moderators. A short list of such ideas includes small scale accelerators [1], dimensionally reduced hydrogen moderators with much increased brightness [2,3,4], and liquid ammonia as a new moderator material [5]. In this contribution we look at the scientific requirements for such sources from the perspective of the neutron scattering instruments, specifically for spectrometers for quasi-elastic and inelastic scattering. Concepts and technologies for both direct and indirect geometry instruments are constantly evolving, and modern neutron optical beam delivery systems are being designed to take full advantage of the source developments. Current trends in spectroscopy include a drive to optimize for smaller samples, to use as many neutrons as possible (repetition rate multiplication), and to make neutron polarization available when needed. Regarding the optical transport from the source to the sample, we will discuss the relationship between moderator size and sample size, and optimized neutron guide illumination. We will also address the impact of the source frequency.

- [1] U. Rücker et al., Eur. Phys. J. Plus 131 19 (2016).
- [2] J. K. Zhao et al., Rev. Sci. Instrum. 84 125104 (2013).
- [3] F. X. Gallmeier et al., Rev. Sci. Instrum. 87 063304 (2016).
- [4] K. H. Andersen et al., J. Appl. Cryst. 51 264 (2018).
- [5] E. B. Iverson et al., J. Phys.: Conf. Ser. 1021 012067 (2018).

Poster back-up

Yes

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