

## **The next 50 years of neutron scattering – a brave attempt at extrapolating current trends way beyond their reasonable validity.**

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Neutron scattering is in a period of upheaval, representing both opportunities and pitfalls. New facilities are being designed and built, while many ageing research reactors are threatened with closure. The result will be a more dynamic ecosystem of neutron facilities, ranging from high-end facilities such as the as-yet unfinished European Spallation Source and the development of its eventual successor, to the population of an intermediate niche of modern research reactors and accelerator-based sources, as well as truly compact neutron sources within the budgetary scope of a university group.

Instrument concepts and technologies have matured greatly over the last ten years, based on the acceptance of the need to make the most of the inherently limited neutron source brightnesses achievable. Even without assuming new game-changing technologies, many trends can be identified which will lead to order-of-magnitude improvements in performance.

There are also a number of scientific trends from which we can reasonably extrapolate instrument design drivers: being able to design materials based on microscopic understanding of their properties, exploring new regimes of extreme conditions such as pressure or magnetic field, understanding the function of biologically active molecules, tying together structure and behaviour over multiple length and time scales. Neutron instrumentation will need to adapt to address these problems, which are all needed for addressing the current and, presumably, future societal grand challenges.

### **Formal Invitation Letter Required**

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