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The French ICONE Instrument Suite

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Neutron scattering remains an indispensable tool for probing the structure and dynamics of matter. To meet the growing demand for advanced neutron capabilities, the French ICONE project is developing a next-generation neutron source based on a high-current compact accelerator (HiCANS). Now in the Technical Design Report (TDR) phase, ICONE's innovative dual-target station design, with tailored pulse characteristics and both cold and thermal moderator options, will enable high versatility and performance.
The instrument suite is split in two packages, each allocated to a tailored target station. The large-scale structure (SANS, reflectometer) and imaging instruments will make the most of high-flux target with long pulse, low repetition rate and short instruments. On the opposite, inelastic neutron scattering and diffraction instruments are well adapted to a high-resolution target with shorter pulses, higher repetition rate and longer instruments.
In this talk, I will present the current design of the ICONE instrument suite, which is being optimized to cover the broadest possible scientific case. This includes a state-of-the-art SANS instrument with extended Q-range, a high-intensity reflectometer for time-resolved studies, and a suite of inelastic scattering and diffraction instrument offering excellent energy and Q-resolution.
Virtual experiments and simulations indicate that ICONE's instruments will achieve count-rates and resolutions well in the range of the Orphée reactor. These virtual experiments are directly compared to real-life experiments carried out at neutron facilities, providing an immediate benchmark of the facility's capabilities. This comprehensive instrument suite will allow researchers to explore fields ranging from materials science and condensed matter physics to biology and cultural heritage.

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