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SuperSUN: A high-density Source of Ultracold Neutrons at ILL

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SuperSUN: A high-density Source of Ultracold Neutrons at ILL

SuperSUN is a newly commissioned superthermal high-density ultracold neutron (UCN) source at the Institut Laue-Langevin (ILL). It employs isotopically pure superfluid helium-4, cooled below 0.6 K, to convert a broad-spectrum cold neutron beam into UCN via inelastic scattering. The source has demonstrated a continuous, reliable operation for over 60 days. During this time, we achieved continuous UCN extraction rates of 21,000 neutrons per second and an in-situ saturated UCN density of 273 cm^{-3} . The combination of high UCN density, extended storage times, and the low-energy spectrum offers new opportunities for fundamental research. This talk will present the source, our experimental results, discuss the technical challenges encountered, and outline the next steps in developing SuperSUN.

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