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Physics with Ultra-Cold and Very-Cold Neutrons at the PF2

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We provide an overview of the capabilities of the modernized Ultra-Cold and Very-Cold Neutron beam ports of the PF2 instrument at the Institut Laue-Langevin.

Experiments using UCN and VCN are important tools to investigate fundamental physics and beyond. Experiments range from dark sector searches over cross-section measurements to neutron instrumentation. The PF2 instrument serves as platform enabling numerous successful UCN and VCN experiments.

We showcase selected user experiment performed at the PF2 using UCN and VCN during the last two years that did benefit from a modernisation campaign at the instrument.

We also present these enhancements and modernizations, including a new NOMAD based DAQ- and experiment-control system, the outcome of a UCN guide system cleaning, and a comprehensive toolbox for beam shaping and instrumentation for the VCN beam line.

These improvements are on the one hand designed to reduce the threshold to perform a broader range of complex future experiments and on the other hand already lead to an increase in neutron flux and a colder spectrum for UCN and VCN.

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