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The Ultimate Spallation Source

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Abstract

A great deal of effort is presently going into exploring how best to design moderators and instruments placed at a long-pulse neutron source. Central to these considerations is the need, in many cases, to reduce the pulse length of the thermalized neutrons to match the resolution requirements of the instruments. At short-pulse neutron sources, the problem is very different: the time spread of neutrons emitted from the moderators often provides an unnecessarily good resolution, while the proton current on the target is inherently limited, both by the constraints imposed by the space-charge density in the accumulator ring and by the very high peak power incident on the target during the very short proton pulse. This intrinsic mismatch between proton pulse length and the neutron pulse length required for the instrument resolution, may in the future be addressed by greatly increasing the length of the accumulator ring, which may be enabled by reusing existing infrastructure.