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## **Indications of Ortho-Hydrogen in SNS Moderators**

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### **Abstract**

The Spallation Neutron Source facility has three supercritical hydrogen moderators, each on an independent circulating loop with a shared cooling plant. The design optimization for these moderators assumed equilibrium hydrogen – that is, 99.8% para-hydrogen at 20 K. Numerous measurements performed over six years of SNS operation indicate, both through the absolute performance and in the variation of performance characteristics with time, that there is substantial ortho-hydrogen present in the moderator(s), and that the amount of ortho-hydrogen varies with the time since condensation. We review the relevant measurements we have made on SNS beam lines, describe the calculated effects of postulated ortho-hydrogen levels, and compare these postulated levels to the predictions of a simple model for the kinetics of irradiated liquid hydrogen.