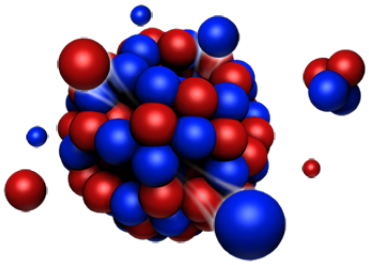

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Design and performance of a superconducting neutron resonance spin flipper

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Despite the challenges, neutron resonance spin echo (NRSE) still holds the promise to improve upon neutron spin echo (NSE) for measurement of slow dynamics in materials. In particular, the modulated intensity with zero effort (MIEZE) configuration allows for the measurement of depolarizing samples and is naturally suited for combination with small angle neutron scattering (SANS) as a result of there being no spin manipulations performed after the sample. The application of NRSE and MIEZE require a high efficiency radio frequency (RF) spin flipper. We present a bootstrap RF neutron spin flipper using high temperature superconducting (HTS) technology, with adiabatic spin flipping capability. A frequency of 2MHz has been achieved, which would produce an effective field integral of 0.35 Tm for a meter of separation in a NRSE spectrometer at the current device specifications. In bootstrap mode, the self-cancellation of Larmor phase aberrations can be achieved by the appropriate selection of the polarity of the gradient coils and has been observed.

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