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Construction of a low-T_c SQUID-based liquid ^{129}Xe NMR probe for search for a permanent atomic EDM SEUNG-KYUN LEE, M.V. ROMALIS, Princeton University — We present recent progress in construction of an ultra-high precision liquid ^{129}Xe NMR probe designed to look for a permanent EDM of an atomic xenon. High spin density and dielectric strength in the condensed phase make an atomic liquid an attractive candidate for search for an EDM. We employ low-transition temperature (T_c) superconducting quantum interference devices (SQUIDs) for detection of low frequency ($\sim$100 Hz) Larmor precession of ^{129}Xe and measurement of magnetic field fluctuation. We shield ambient magnetic field noise by a superconducting magnetic shield immersed in a liquid helium cryostat. A magnetic field resolution better than 1 fT/Hz$^{1/2}$ and ^{129}Xe frequency resolution on the order of 1 nH/Hz$^{1/2}$ are expected from this design. Currently experiments are under way in a prototype setup to measure the signal-to-noise ratio and frequency stability in SQUID-detected ^{129}Xe NMR, and to determine low-temperature leakage current under high voltage in a sapphire-based liquid xenon cell.

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