

## A Persistent Current 1.3 GHz (30.5 T) NMR

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**Abstract**— A 1.3 GHz (30.5 T) NMR is required for breakthroughs in the fields of structural biology and materials science, such as analysis of human brain amyloid beta protein to address Alzheimer's disease. We have made conceptual designs of a 1.3 GHz NMR magnet with LTS outer coils and HTS (REBCO and Bi-2223) inner coils including several tens of conductor junctions. The ideal operation of the magnet is a persistent current (PC) mode. For the PC mode operation as a high-resolution NMR magnet, the total resistance of the series connected HTS and LTS coils in the magnet has to be as low as 0.1 nΩ and therefore we have to develop superconducting joint technologies for HTS-HTS junctions and HTS-LTS junctions. The challenge to realize the magnet has started with novel joint technologies.

**Keywords (Index Terms)**— NMR, persistent current, superconducting joint.

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