

**Preparation and Testing of Prototype 12.5 kA High Temperature Superconducting Current Leads for the LHC at CERN,** S.M. HARRISON, D.M. JENKINS, K.D. SMITH, A.J. STREET, M. TOWNSEND, Oxford Instruments;

A. BALLARINO, A. IJSPEERT, CERN - In most high current superconducting magnet systems, the largest cryogenic losses are associated with the leads which carry current from the room temperature power supply to the cold circuit. High temperature superconducting (HTS) materials combine low thermal conductivities with the ability to carry currents without ohmic dissipation at temperatures up to 100 K or more, and so offer the possibility of drastically reducing the consumption of cryogens. Oxford Instruments have been investigating the potential for the use of HTS materials in current leads for several years. In 1995, this work was a starting point for a collaboration with CERN to demonstrate the feasibility of HTS leads for powering the LHC dipoles at currents of 12.5 kA. This paper outlines the efficiency gains anticipated for the LHC by using HTS leads. We then describe the designs of two leads using different HTS materials supplied by two European manufacturers, and also the results of tests carried out under simulated LHC conditions at currents to 12.5 kA.