Title
A Superconducting Pressure Test-Station for Material Property Tests at 4.2 K

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A superconducting pressure test-station for material property tests at 4.2 K[1]

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ABSTRACT

A material property test system for use in liquid helium utilizing two repelling superconducting solenoids is described. The system is optimized for three parameters : to obtain the highest possible pressure on a small test volume using an existing cryostat, keeping the system as simple as possible in operation, and finally minimizing the use of liquid helium. To eliminate the use of a large hydrolic pressure system with all the related problems of transferring the applied pressure to the sample while maintaining a low heat-leak, a design with two superconducting coils was chosen. The system is designed to generate a force of 260 kN at a coil current of 100 A, thus yielding a pressure of 210 MPa at a 40 mm diameter maximum radius.

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