

## **AP1-1-INV**

### **Portable high-field magnet systems using bulk high-temperature superconductors**

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Bulk high-temperature superconductors can be used, when cooled to cryogenic temperatures, as super-strength, stable permanent magnets capable of generating fields of several Tesla. This makes them attractive for a number of engineering applications that rely on high magnetic fields, including compact and energy-efficient motors/generators with unprecedented power densities, magnetic separation and compact and portable magnetic resonance imaging (MRI) and nuclear magnetic resonance (NMR) systems.

In this presentation, we report our recent developments in portable high-field magnet systems using bulk high-temperature superconductors, including: 1) cryogenic system design that emphasises flexibility and portability, but with operating temperatures down to around 50 K or lower, 2) a compact pulsed field magnetisation (PFM) system, including pulse waveform control and the exploitation of flux jumps during the PFM process, and 3) solenoid- and split-type magnetising coil options.

Keywords: Bulk high-temperature superconductors, Portable magnet system, Large scale applications