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Cryogenic Tests of Electronic Components and Sensors for Superconducting Magnet Instrumentation

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This research explores the development of advanced electronic systems for magnetic measurements under various operating conditions. The study focuses on two main areas: Characterization of electronic components and sensors in extreme temperature environments, from cryogenic to room temperature. Development of electronics for standard magnetic measurements and quench localization techniques at room temperature. The aim is to identify and optimize suitable components for advanced instrumentation in the field of magnetic measurements, with particular attention to the performance of amplifiers, passive elements, digital components, and various types of sensors. Experimental results show how some components maintain functionality across a wide temperature range while others require specific adaptations. In parallel, innovative solutions for precise magnetic measurements and early quench detection techniques at room temperature are presented. This research contributes to the advancement of electronic systems for magnetic measurements in various applications, from superconductor technologies to high-energy physics, medical imaging, and advanced materials science.

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