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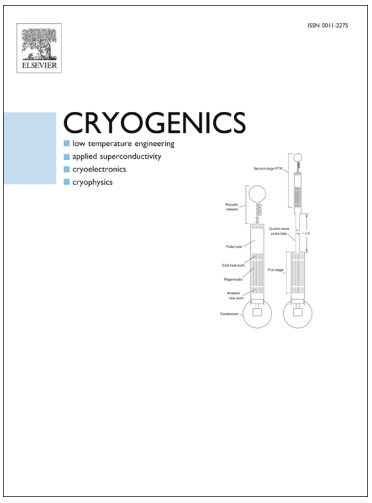

Multilayer planar inductor array based angular position sensor for cryogenic application

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Multilayer planar inductor array based angular position sensor for cryogenic application

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Abstract

The design, development and testing of a cryogenically operated multilayer planar inductor array based eddy current angular position/rotation transducer is claimed. An array of 4 multi-layered coils is used to divide the 360˚ into four sectors of 90˚ each. Switching between each of the inductor is done by a cold electronics based multiplexer circuit coupled to an unbuffered inverter LC oscillator. The angular displacement is a function of frequency of cold electronic LC oscillator. The pickup coil forms the inductor of the oscillator which is operated down to 4.2 K and uses thermal cycled stable components. The change in frequency as a function of angular displacement was calibrated at cryogenic temperatures. The developed sensor was found to have good thermal stability, sensitivity and repeatability over the entire cryogenic range.

Keywords: `Multilayer Inductor Array; Eddy current; Multiplexed LC Oscillator; Cold electronics; Angular displacement; Cryogenics`

1. Introduction

For many applications involving cryogenics, viz. low temperature physics, space applications etc., measurements of accurate angular positions are critical [1]. Usually, potentiometers, Hall Effect sensors and fiber brag grating based sensors are commonly used for such applications [2–5]. Few of these have been

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