

DK9300061-142

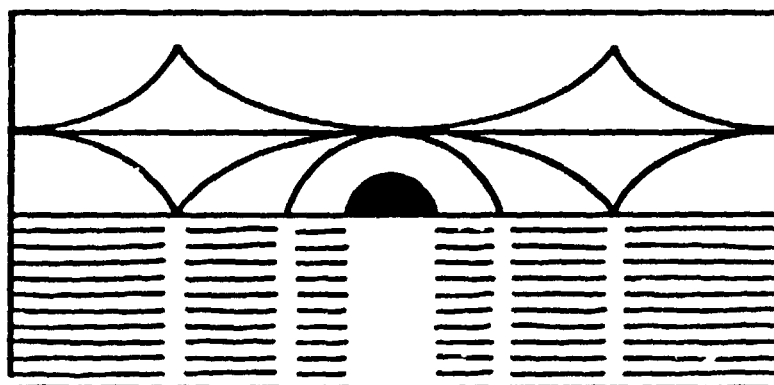
RISØ

Risø-R-628(EN)

# Proceedings of the Joint Nordic Spring Meeting '92

Edited by Per-Anker Lindgård

JOINT NORDIC SPRING MEETING



7-10 MAY 1992  
Nyborg Strand, Denmark

Risø National Laboratory, Roskilde, Denmark  
May 1992

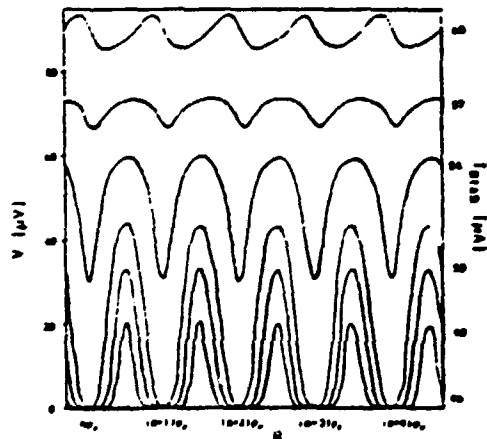
CPI2  
TOWARDS A HIGH T<sub>c</sub> DC-SQUID MAGNETOMETER

J.W.M. Hilgenkamp, R.P.J. IJsselsteijn, A.J.H.M. Rijnders, W. Jaszczuk, P. van de Riet, J. Flokstra and H. Rogalla

University of Twente, Faculty of Applied Physics, P.O. Box 217,  
7500 AE Enschede, The Netherlands.

Two key elements of a high T<sub>c</sub> DC-SQUID magnetometer are the superconducting ring interrupted by two Josephson junctions (DC-SQUID) and a flux transformer consisting of a pick-up coil and a (multi-turn) input structure. In this contribution we report on results obtained in the fabrication of both elements.

The characteristics of YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-d</sub>/PrBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-d</sub>/YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-d</sub> ramp type junctions and DC-SQUIDs based on these junctions produced in our group have been reported extensively lately.<sup>1</sup> Results obtained with Josephson junctions produced in the same way as the previously mentioned junctions, but without the thin PrBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-d</sub> barrier layer, will be presented here. Since the critical current density of these junctions is dependent on the used etching procedure we believe that the barrier is formed by a thin amorphized YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-d</sub> layer rather than by a grain boundary. Voltage modulation as a function of the bias current of a DC-SQUID based on these junctions measured at 4.2K is shown in the figure. IV-characteristics, voltage modulation and noise properties as a function of temperature will be presented.



Using Ar-ion etching under an angle high quality cross-overs and via-contact have been fabricated.<sup>2</sup> These are the necessary ingredients for a multi-turn input coil. By combining two chips, one of them containing the DC-SQUID and the other containing the flux transformer, it is possible to form a high T<sub>c</sub> DC-SQUID magnetometer. Results on this will be reported.

<sup>1</sup>J. Gao, *Preparation and characterization of high T<sub>c</sub> superconducting thin films and devices*. PhD-thesis, University of Twente (1991).

<sup>2</sup>J. Flokstra, R.P.J. IJsselsteijn, J.W.M. Hilgenkamp, *Basic elements for photodeposited high T<sub>c</sub> thin film devices*. Subm. to Thin Solid Film.