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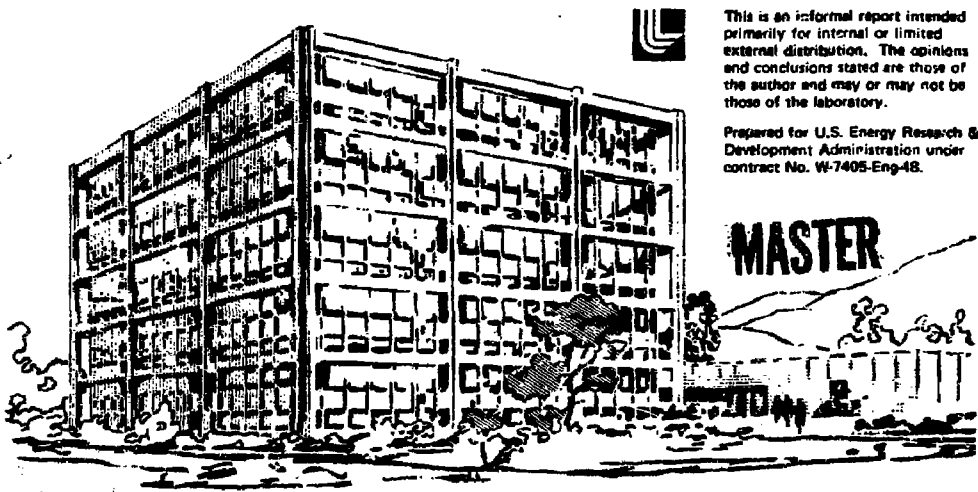
Lawrence Livermore Laboratory

DT FUSION NEUTRON IRRADIATION OF BNL-LASL
SUPERCONDUCTOR WIRES

Susan C. MacLean

Unclassified

August 10, 1976



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Dr. Richard A. Meyer of LLL generously agreed to allow a thin sample package be placed in front of the rabbit he would be using during an irradiation run at the LLL Rotating Target Neutron Source (RTNS) in July, 1976.

Dr. C. L. Snead, Jr. of Brookhaven National Laboratory and Dr. Don M. Parkin of Los Alamos Scientific Laboratory returned eleven superconductor wires to receive further irradiation of 10^{18} neutrons/cm². Two of the wires, 19-core Nb₃Sn multifilament wires, had previously received 1.86×10^{18} neutrons/cm². The remaining wires had received 8.06×10^{17} neutrons/cm² at the RTNS. These were three pieces of Nb₃Sn single core, three pieces of V₃Ga single core, two pieces NbTi Supercon 402, and one piece NbTi cupronickel jacketed. The wires varied in length between 19 and 28 mm. The wires were packaged in a single layer in aluminum foil. Niobium dosimetry foils, 12 mm in diameter and 0.03 mm thick, were centered on both sides of the wires. This package was taped to the front of the rabbit.

The neutron irradiation was carried out by the LLL E Division Accelerator Staff during the period July 26 to 29, 1976. Neutron production was monitored continuously with a proton recoil counter and recorded each hour. The dose record is attached. Beam-on time was 48.73 hours.

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Following the irradiation the sample packet was stored for a few days to allow for decay of short-lived isotopes. The samples were retained for further irradiation and the dosimetry foils were delivered to Austin L. Prindle in the LLL Radiochemistry Division for gamma ray counting.

The average fluence of each dosimetry foil was calculated using the method described in UCRL-51393, Rev. 1. However the cross section used for the activation of the 10.16 day isomer of niobium by 14.8 MeV neutrons was changed to 458 millibarns. The results were as follows:

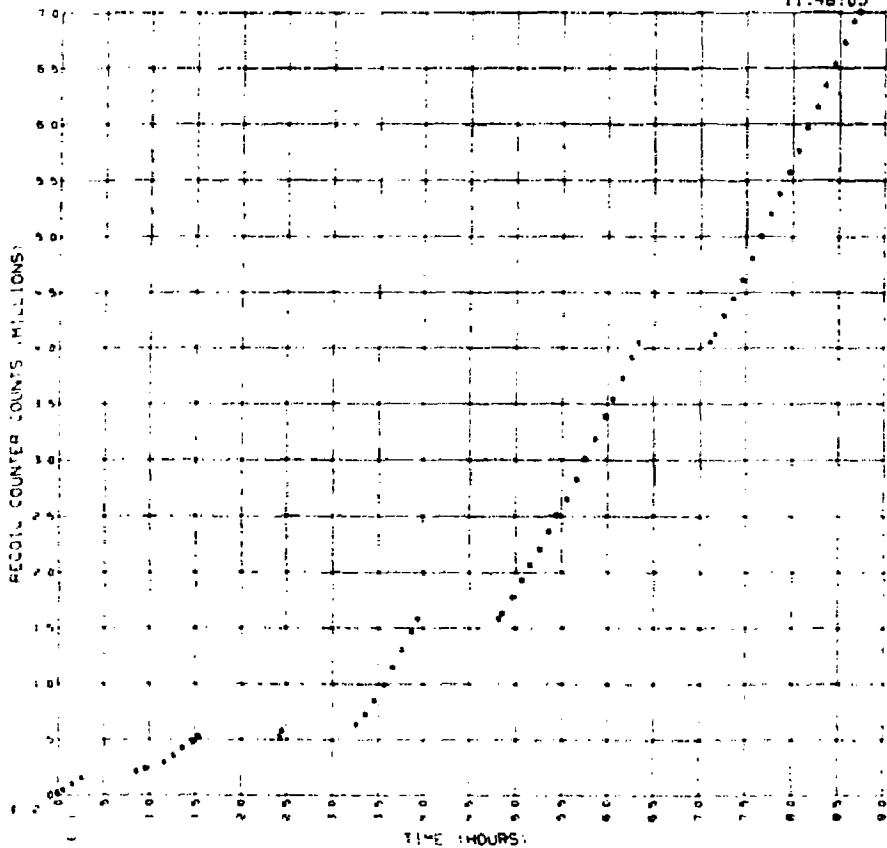
<u>Dosimetry Foil</u>	<u>Fluence(neutrons/cm²)</u>
Nb-633	8.46×10^{16}
Nb-634	6.98×10^{16}

The estimated overall uncertainty of these results is $\pm 7.5\%$. The relative uncertainty between the two values is about $\pm 2\%$. The fluences given here represent average fluences over the volume of each dosimetry foil.

RTNS IRRADIATION OF JULY 26 TO 29, 1976

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