Superconductor Shields Test Chamber From Ambient Magnetic Fields

The problem: Constructing an inexpensive test chamber that maintains a constant, low magnetic field.

The solution: A test chamber that is shielded from ambient magnetic fields by a lead foil cylinder maintained in a superconducting state by liquid helium.

How it's done: The lead cylinder, constructed of 0.007-inch-thick foil, is suspended in a Dewar vessel filled with liquid helium to cool the lead to a superconducting state. A current is induced in the lead foil cylinder by the application of a very small magnetic field (less than $2 \times 10^{-5}$ gauss) during the cooling process. The central space within this Dewar system then encloses the initially applied small magnetic field at a constant value even in the presence of steady or changing ambient magnetic fields.

Notes:
1. The internal field of this device has been demonstrated to be axially stable to better than $+1$ gamma ($10^{-5}$ gauss) $-2$ gamma in an ambient field of 500 gamma.
2. This innovation should be useful as a laboratory research and testing device for magnetic components.

(continued overleaf)
3. Inquiries concerning this innovation may be directed to:
   Technology Utilization Officer
   Jet Propulsion Laboratory
   4800 Oak Grove Drive
   Pasadena, California, 91103
   Reference: B65-10297

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated by NASA.

Source: A. F. Hildebrandt (JPL-627)