

The SQUID at 50: From Cosmology to Medicine

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Room 118 Nieuwland Science Hall

Refreshments @ 3:30 in 202 NSH

Following Brian Josephson's prediction in 1962, Josephson tunneling through an oxide barrier separating two superconducting films was first observed in 1963. Quantum interference in a superconducting ring containing two Josephson junctions was demonstrated in 1964. The first practical SQUIDs (Superconducting QUantum Interference Devices) included a blob of solder frozen around a length of niobium wire. Today's SQUIDs, fabricated from patterned, multilayer thin films on silicon wafers, offer extraordinary sensitivity to magnetic flux. These SQUIDs can be configured for a wide range of applications, including magnetometers and quantum-limited amplifiers. I describe experiments to search for the axion—a candidate particle for cold dark matter—and to perform magnetic resonance imaging (MRI) in microtesla magnetic fields, four orders of magnitude lower than in clinical MRI systems.