

Abstract Submitted  
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**Evidence for nonmonotonic magnetic field penetration in a Pippard superconductor** VLADIMIR KOZHEVNIKOV, Tulsa Community College, CLAUDIU GIURANIUC, University of Lille, MARGRIET VAN BAEL, KRISTIAAN TEMST, CHRIS VAN HAESSENDONCK, Katholieke Universiteit Leuven, TODOR MISHONOV, St Clement of Ohrid University at Sofia, TIMOTHY CHARLTON, ROBERT DALGLIESH, Rutherford Appleton Laboratory, YURII KHAIDUKOV, YURII NIKITENKO, VICTOR AKSENOV, Joint Institute for Nuclear Research, VLADIMIR GLADILIN, Katholieke Universiteit Leuven, VLADIMIR FOMIN, JOZEF DEVREESE, Universiteit Antwerpen, JOSEPH INDEKEU, Katholieke Universiteit Leuven — Polarized neutron reflectometry (PNR) provides evidence that *nonlocal* electrodynamics governs the magnetic field penetration in an extreme low- $\kappa$  superconductor. The sample is an indium film with a large elastic mean free path ( $11\ \mu\text{m}$ ) deposited on a silicon oxide wafer. It is shown that PNR can resolve the difference between the reflected neutron spin asymmetries predicted by the local and nonlocal theories of superconductivity and therefore can be used for direct measurements of the microscopic intrinsic parameters of superconductors. The experimental data support the nonlocal theory, which predicts a *nonmonotonic decay* of the magnetic field.

Vladimir Kozhevnikov  
Tulsa Community College

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