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Neutron scattering and gap structure in KFe_2Se_2 THOMAS MAIER, Center for Nanophase Materials Sciences and Computer Science and Mathematics Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, ANDREAS KREISEL, YAN WANG, PETER HIRSCHFELD, Department of Physics, University of Florida, Gainesville, FL 32611, DOUGLAS SCALAPINO, Department of Physics, University of California, Santa Barbara, CA 93106 — The structure of the superconducting gap in the alkali metal iron selenide KFe_2Se_2 remains controversial. Due to the absence of Fermi surface hole-pockets, the usual sign-changing $s^{\pm}$ state is unlikely and node-less d-wave as well as bonding-anti-bonding s-wave gap structures have been suggested. Here we use an RPA BCS approximation for a realistic 3D 10-orbital tight-binding model to calculate the neutron scattering response for different gap structures. We show that both d-wave and s-wave states are consistent with a neutron resonance in the superconducting state, and discuss possible ways to distinguish between the different gap structures.

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