

Multigap Anisotropic Superconductivity in $V_2\text{Ga}_5$

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Abstract. We present a theoretical analysis of the multigap anisotropic superconducting state in $V_2\text{Ga}_5$. Density-functional-theory calculations are used to determine the electronic structure and Fermi-surface sheets, which serve as the basis for a multiband singlet superconducting model. Guided by experimental observations, we introduce anisotropic superconducting gap functions with sheet-resolved normalization on the Fermi surface and solve the corresponding self-consistent gap equations.

The model yields the temperature evolution of the superconducting gaps on different bands and allows us to calculate the electronic heat capacity and directional tunneling conductance. By comparing the calculated thermodynamic response with experiment, we identify a gap structure consistent with the observed superconducting behavior.

ACKNOWLEDGMENT

The work was supported by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project No. 09I05-03-V02-00071, and the Ministry of Education, Research, Development and Youth of the Slovak Republic, provided under Grant No. VEGA 1/0104/25, the Slovak Academy of Sciences project IMPULZ IM-2021-42.