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[148] Tunable unconventional kagome superconductivity in charge ordered RbV₃Sb₅ and KV₃Sb₅

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We utilized pressure-tuned and ultra-low-temperature muon-spin spectroscopy to uncover the unconventional nature of superconductivity in kagome metals (Rb,K)V₃Sb₅ [1,2]. At ambient pressure, the superconducting state displays a nodal energy gap and a reduced superfluid density, which is attributed to the competition with the charge order. Upon applying pressure, the charge-order is suppressed, the superfluid density increases, and the superconducting state evolves from nodal to nodeless. Once optimal superconductivity is achieved, we find a superconducting pairing state that is not only fully gapped, but also spontaneously breaks time-reversal symmetry. Our results offer unique insights into the nature of the pairing state.

[1]Mielke-et.al., and Guguchia, Nature 602, 245(2022).

[2]Guguchia-et.al., Nature Communications 14, 153(2023).

Theoretical Work

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