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Possible p -wave parity in Cr-based superconductor $\text{Pr}_3\text{Cr}_{10-x}\text{N}_{11}$

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Superconductivity with a critical temperature $T_C \sim 5.25$ K was recently reported in the Cr-based superconductor $\text{Pr}_3\text{Cr}_{10-x}\text{N}_{11}$. The large upper critical field $H_{C2} \sim 20$ T, and the strong correlation between $3d$ electrons derived from specific heat, suggest the unconventional superconductivity nature of this compound. We performed muon-spin rotation/relaxation (μ SR) measurements on a high-quality polycrystalline of $\text{Pr}_3\text{Cr}_{10-x}\text{N}_{11}$ down to 0.027 K, and specific heat measurements under different magnetic fields up to 9 Tesla. Our μ SR data indicate that time-reversal symmetry is broken in the superconducting state of $\text{Pr}_3\text{Cr}_{10-x}\text{N}_{11}$, and the superconducting energy gap is consistent with a p -wave model, which is also supported by the specific heat data.

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