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Switching of magnetic domains reveals evidence for spatially inhomogeneous superconductivity

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The interplay of spin and charge fluctuations can lead to quantum phases with exceptional electronic properties. A case in point is magnetically-driven superconductivity, where magnetic correlations fundamentally affect the underlying symmetry and generate new physical properties. The superconducting wave-function in most known magnetic superconductors does not break translational symmetry. However, it has been predicted that modulated triplet p-wave superconductivity occurs in singlet d-wave superconductors with spin-density wave (SDW) order.
Here we report evidence for the presence of a spatially inhomogeneous p-wave Cooper pair-density wave (PDW) in CeCoIn5. We show that the SDW domains can be switched completely by a tiny change of the magnetic field direction, which is naturally explained by the presence of triplet superconductivity. Further, the Q-phase phase emerges in a common magneto-superconducting quantum critical point. The Q-phase of CeCoIn5 thus represents a generic example where spatially modulated superconductivity is associated with SDW order.

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