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Hidden Reentrant and Larkin-Ovchinnikov-Fulde-Ferrell Superconducting Phases in a Magnetic Field in $(TMTSF)_2ClO_4$[1] ANDREI LEBED, Department of Physics, University of Arizona — We solve a long-standing problem about a theoretical description of the upper critical magnetic field, parallel to conducting layers and perpendicular to conducting chains, in $(TMTSF)_2ClO_4$ superconductor. In particular, we explain why the experimental upper critical field, $H_{c2}^b = 6T$, is higher than both the quasi-classical upper critical field and Clogston paramagnetic limit. We show that this property is due to the coexistence of the hidden Reentrant and Larkin-Ovchinnikov-Fulde-Ferrell phases in a magnetic field in a form of three plane waves with non-zero momentums of the Cooper pairs. Our results are in good qualitative and quantitative agreement with the recent experimental measurements of H_{c2}^b and support a singlet d-wave-like scenario of superconductivity in $(TMTSF)_2ClO_4$.

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