

Multi-band superconductors: between the types I and II

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Multi-band superconductors often reveal untypical vortex configurations, not observed in common superconducting materials. The origin of such states is yet not clear and is being actively debated. Also is not clear whether those superconductors fall into one of the standard types or this classification needs be amended. We consider another dimension to this problem by studying superconductivity in vicinity of a critical Bogomolny point with properties notably different from the two standard types. We demonstrate that this transitional domain is hugely enlarged in multi-band superconductors. We argue that for analysis of multi-band materials the Ginzburg-Landau theory is inadequate and one must use its extended version.