

Abstract Submitted  
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**Vortex matter in two-band mesoscopic superconductors**<sup>1</sup> MILO-RAD MILOSEVIC, ROELAND GEURTS, LUCIA KOMENDOVA, FRANCOIS PEETERS, Universiteit Antwerpen, Belgium — Using two-band Ginzburg-Landau theory, we discuss the effect of Josephson coupling and the mutual drag between two interacting superconducting condensates in mesoscopic samples exposed to a homogeneous magnetic field. We show that drag between condensates in combination with order parameter coupling strongly affects the interband vortex-vortex interaction. This leads to a unique set of possible vortex configurations, comprising *asymmetric*, *non-composite*, and *dynamic* vortex states. We also calculate the demagnetization properties of the samples, and show how latter exotic vortex states can be detected by magnetometry. Finally we introduce the magnetic coupling between condensates, and study in particular the case where one band is type II and the other type I, i.e. the sample is effectively of I.x type. Both the found vortex states and the calculated  $M(H)$  loops show a clear signature of the mixed type of superconductivity, which we find to be strongly affected by the ratio of coherence lengths in two condensates.

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Milorad Milosevic  
University of Antwerp

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