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Bloch line 'crystallization' as intrinsic pinning mechanism in ferrimagnetic YIG films[1] JOHN NEAL, Department of Physics, University of Bath, UK, MILORAD MILOSEVIC, Department of Physics, University of Bath, UK, and Departement Fysica, Universiteit Antwerpen, Belgium, SIMON BENDING, Department of Physics, University of Bath, UK, IRINA GRIGORIEVA, ALEXANDER GRIGORENKO, Department of Physics and Astronomy, University of Manchester, UK — The present intense drive to develop current-switched magnetic storage media has lead to a renewed interest in ferrimagnetic garnet films which, for several decades, were the focus of devices exploiting manipulation of magnetic 'bubbles'. In such uniaxial materials, the appearance of Bloch lines in structured domain walls strongly influences their *dynamic* properties in an applied magnetic field. Here we show that the *static* magnetic properties of garnet films can also be profoundly influenced due to *crystallization* of Bloch lines into a square lattice along adjacent domain walls. This rigid lattice *intrinsically* pins domain walls and suppresses the expected expansion/contraction of magnetic domains in an applied field. Even in the pinned regime, ultra-sensitive scanning Hall probe measurements reveal the *nanoscale motion* of magnetic blocks in the walls comprising an integer number of Bloch-lines. Although the estimated displacements (∼2-25 nm) are very much smaller than the domain period, we observe highly correlated motion across many domain walls, driven by the strongly interacting Bloch line lattice.

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