



## **Magnetic induction mapping of magnetite crystals above and below the Verwey transition using electron holography**

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Off-axis electron holography in the transmission electron microscope is used to image the magnetic induction in isolated and closely spaced magnetite crystals in magnetotactic bacteria. The magnetic microstructure in the particles is related to the fundamental effects of morphology, crystallography, and to interparticle interactions, which can be closely studied given the simple nature of the arrays of crystals in these bacteria. In an isolated, faceted magnetite crystal, the magnetisation direction is observed to change when the particle is cooled from room temperature to below the Verwey transition. In contrast, for magnetite crystals that are arranged in chains, the magnetic induction is observed to undulate along the length of the chain at low temperature. This effect may result from a competition between interparticle interactions and variations in the angle between the easy axis of magnetisation and the chain axis.