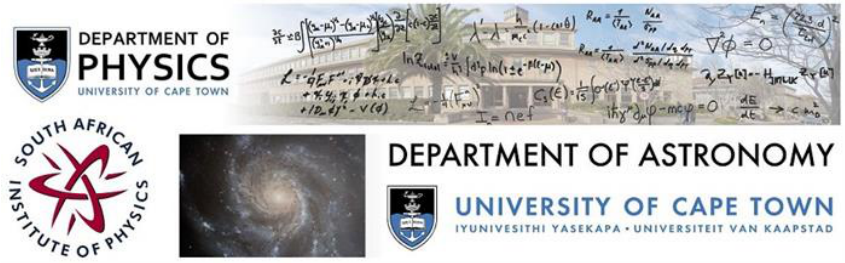

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van Hove singularities in Sr₃Ru₂O₇

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Abstract content
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The metamagnetism found in the 4d transition metal oxide Sr₃Ru₂O₇ is investigated by analysing a large set of high quality angle-resolved photoelectron spectroscopy (ARPES) data on Sr₃Ru₂O₇, that was collected at the synchrotron radiation facility BESSY in Berlin, Germany. The unusual iterant metamagnetism is theoretically predicted to be caused by van Hove singularities (vHs), which are narrow peaks in the electronic bands in the vicinity of the Fermi energy level, E_F. The application of a magnetic field can cause these peaks to move and cross E_F. The peaks are spin-polarised giving rise to a sharp incline in the magnetisation when they shift past E_F. The ARPES data obtained was used to locate such peaks in the electronic density of states. Normalised line profiles were extracted at various values of k_{//} and peaks close to E_F were fitted to determine their energy. The histogram counting method developed by Tamai et al. [1] was used to find the position of the vHs's as a function of energy at various locations on the Fermi surface. This method ignores matrix element effects and statistically allows for a higher resolution than the experimental one. The majority of the peaks were found within 5 meV of E_F, which corresponds to the Zeeman shift at the metamagnetic transition. This supports the hypothesis that spin-polarised vHs's underlie the metamagnetism in this system.

[1] A. Tamai et al., Phys. Rev. Lett. 101, 026407 (2008).

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