



# Magnetic Phase Transitions and Magnetoelastic Coupling in a Two-Dimensional Stripy Antiferromagnet

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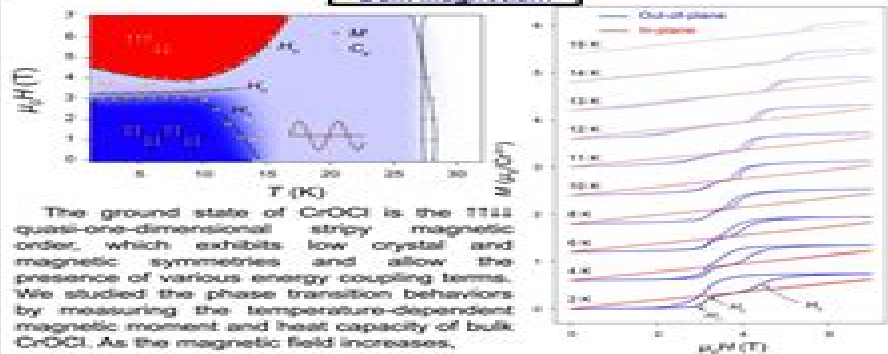
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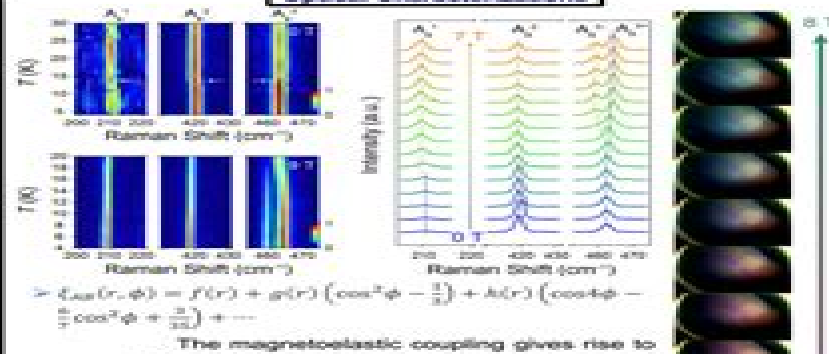
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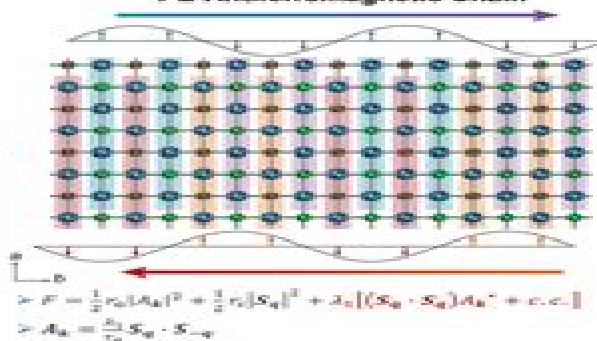
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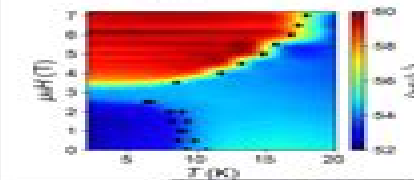


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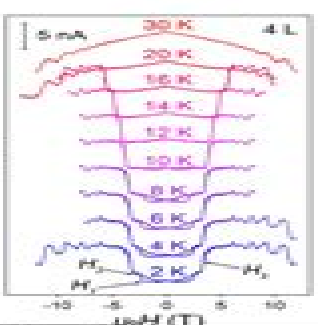


$$\frac{\partial F}{\partial \phi} = -\frac{1}{2} \left[ \frac{\partial \epsilon_{xx}}{\partial \phi} \frac{\partial \phi}{\partial \phi} + \frac{\partial \epsilon_{yy}}{\partial \phi} \frac{\partial \phi}{\partial \phi} \right] = -\frac{1}{2} \left[ \frac{\partial \epsilon_{xx}}{\partial \phi} + \frac{\partial \epsilon_{yy}}{\partial \phi} \right] \frac{\partial \phi}{\partial \phi}$$

Tunneling magnetoresistance is another sensitive probe to detect the magnetic phase transitions and structural transitions in ultra-thin magnets. We constructed the phase diagram of a 4-L CrOCl sample using the tunneling current data, confirming the persistence of magnetic order and magnetoelastic coupling in 2D limit.



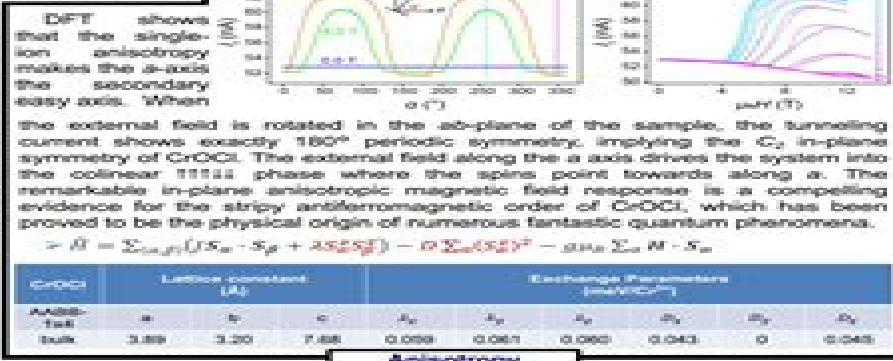
## Tunneling Magnetoresistance



## Summary and Reference

We verified the magnetoelastic coupling effect in exfoliated CrOCl by Raman spectroscopy and investigated the magnetism of few-layer CrOCl by tunneling magnetoresistance. Combining the characterization results with first-principle calculations, we uncovered the multi-step magnetic phase transitions under the external field along the easy axis down to 2D limit. Our findings not only advance the understanding of this unexplored promising material, but also reveal the rich physics and potential for spintronic devices of magnetoelastic materials.

[1] *Nano Letters* **22**, 3 (2022).



# Magnetic Phase Transitions

**Ausloos M.**



## **Magnetic Phase Transitions:**

**Magnetic Phase Transitions**, 1983      Magnetic Phase Transitions In Single Crystals David P Belanger, 2022-07-27

Magnetic crystals are ideal systems to study the universal properties of phase transitions particularly systems with quenched randomness and frustration Pure systems with different symmetries provide the foundation for studies in corresponding systems with quenched randomness Because phenomena near phase transitions have universal properties results from bulk magnetic crystals provide a basis for understanding phase transitions in films and nanoparticles as well as many non magnetic materials This motivates the subject of this book which discusses phase transitions studies in magnetic crystals from the perspective of an experimentalist who has done extensive work in the field The advantage is that many experimental techniques are described in sufficient detail for a good understanding of the results and their comparison to theory

**Magnetic Phase Transitions (Volume 48)**. Ausloos M., 1983      Magnetic Phase Transitions M. Ausloos, R.J.

Elliott, 2012-12-06 The present volume contains the courses given at a Summer School on Magnetic Phase Transitions held at the Ettore Majorana Centre for Scientific Culture at Erice Trapani Italy in July 1983 under the auspices of the Condensed Matter Division of the European Physical Society in their series on Materials Science and Technology The student participants came from West Germany Great Britain Brazil Greece Switzerland Sweden Italy USA and The Netherlands The lecturers came from various European countries Israel USA and Canada The atmosphere at the meeting was excellent and a good spirit of companionship developed during two weeks of working together The spread of interests among the lecturers and students was diversified but balanced The main lecturing contributions are reported in this volume They represent up to date reviews in a pedagogical style In addition informal presentations on current research interests were made which have not been included The school attempted to summarize the current position on the properties of magnetic phase transitions from several points of view The range and scope of the theoretical techniques and of particular aspects of materials or phenomena as observed experimentally were very well put forward by the lecturers The grouping of manuscripts in chapters does not represent however the schedule followed during the school Contributions on mean field approximations and renormalization group methods either for static or dynamic phenomena can be found at various places in the following sections      Structural and Magnetic Phase Transitions in Minerals S. Ghose, J.M.D. Coey, E. Salje, 2012-12-06 This volume in

Advances in Physical Geochemistry presents the latest synthesis of theory and experimental data pertaining to structural and magnetic phase transitions in a variety of geochemically important minerals The book is the first to cover the impact of this rapidly progressing area of solid state physics in earth sciences and reflects its growing significance for mineralogy and petrology      High-field Magnetic Phase Transitions Maurits Willem van Tol, 1972      Magnetic Phase Transitions Marcel

Ausloos, Roger J. Elliott, 1983 The present volume contains the courses given at a Summer School on Magnetic Phase Transitions held at the Ettore Majorana Centre for Scientific Culture at Erice Trapani Italy in July 1983 under the auspices of

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structural phase and magnetic resonance various types of magnetic resonances and their underlying principles and the radiofrequency methods of nuclear magnetic resonance The text also describes quadrupole methods the microwave technique of electron spin resonance and the Mossbauer effect Phase transitions in various systems such as fluids liquid crystals and crystals including paramagnets and ferroelectrics are also considered Physicists and scientists working in energetic materials laboratories will find the book invaluable Integral Systems, Solid State Physics and Theory of Phase Transitions V. V. Dodonov, Vladimir Ivanovich Man'ko, 1991

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