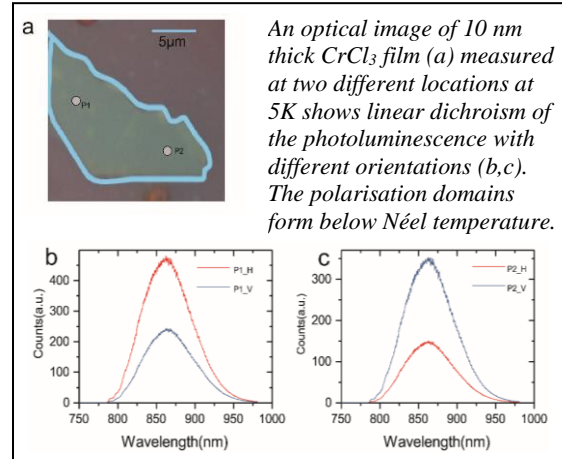


Spin-lattice coupling in chromium chloride and other chromium halides.

Advertising institute: PGI-9 Semiconductor Nanoelectronics

Project description:

Chromium chloride is a layered insulator which becomes antiferromagnetic below about 17K. While its magnetic properties are relatively well known, our recent photoluminescence measurements revealed unique linear dichroism of light emitted in optical transitions between d-orbitals of the chromium ion. Linear dichroism, observed during optical transition when the spins in the monolayer are ordered in CrCl_3 is a manifestation of the crystal lattice distortion in the excited state of the ion. In this project, you will combine photoluminescence and reflectance measurements with transmission electron microscopy to compare optical and structural properties of the material at different temperatures and magnetic fields. The data will be analysed to elucidate the origin of the lattice distortions and get insight into interactions between the spin of excited electron and the spins of the neighbouring ions. Your tasks will involve samples preparation, measurements and data analysis. You will compare the properties of CrCl_3 with CrBr_3 and CrI_3 , which have the same crystal structure but different magnetic properties. Apart from the understanding the properties of the materials, it is expected that the project will establish photoluminescence as means to study many-body effects between excited electrons and those in the ground state.



Your profile:

- Have bachelor degree in Physics
- Be able to work independently as well as in a small team
- Enjoy working in a laboratory
- Be able to get to the heart of the problem and solve it quickly and efficiently
- Have good communication and documentation skills in English

What we offer:

- Experienced and friendly research team
- State-of-the-art characterisation equipment
- Motivating research environment

Please send your application (including CV and course transcript) by email to Prof. B. Kardynal (b.kardynal@fz-juelich.de)