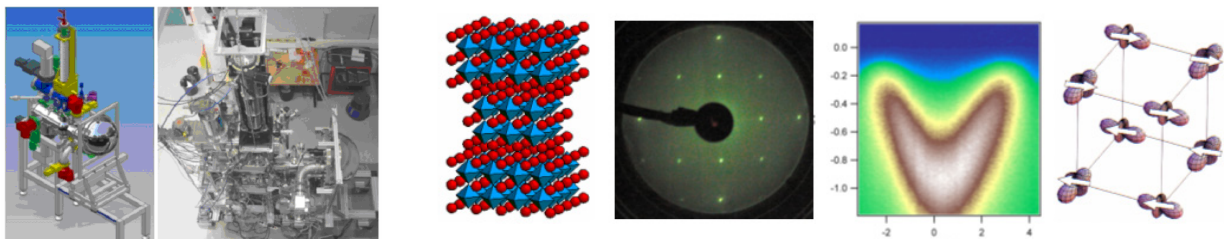


Transport and ARPES studies of colossal magnetoresistant manganites

The manganites and related perovskite-like oxides took the solid state science world by storm in the early 1990's when they exhibited changes in electrical resistance of several orders of magnitude upon application of a magnetic field - colossal magnetoresistance (CMR) was born. Like their cousins, the high T_c superconducting cuprates, the CMR manganites are late transition metal oxides whose electronic properties go way beyond the framework of the 'standard model' for metals - Fermi liquid theory. Many of their key physical parameters (think of bandwidths, exchange integrals, on-site Coulomb repulsion, charge transfer energies, phonon energies) are of similar magnitude, resulting in a highly rich and complex physical landscape, involving interplay and competition between phenomena such as charge and orbital ordering, double-exchange ferromagnetism, Mott-Hubbard physics, strong electron-phonon coupling and phase separation.

In this M.Sc. project you will join in the group's ongoing research into the electronic structure of quasi-two manganites. We're involved in crystal growth (via floating zone techniques) and characterisation (x-ray diffraction, electron beam microprobe), magnetic and transport studies, surface structural investigations (via LEED) and spectroscopic studies using k-space microscopy (a.k.a. ARPES), so there are plenty of possibilities. Given this breadth of activities, the main focus of the project can be tailored to a certain extent to match the interests of a good potential Master, who should have a good grounding in the physics of the solid state, plenty of enthusiasm and good team skills.



The FAMoS microscope, in the PC and in reality in lab K03 in the WZI. Crystal structure, low energy electron diffraction and photoemission data from a $(La,Sr)_3Mn_2O_7$ crystal. Right: orbital ordering.

This project involves real research, running real-time on the group's front-line research equipment, thus a serious commitment from you is expected. In return you get a real taste of research in a globally competitive and fast-moving field. If the timing's right and you've shown yourself to be a motivated and skilled experimentalist, you can also join the group at a beamtime, carrying out photoemission experiments at a third-generation synchrotron radiation source such as BESSY in Berlin or SLS near Zürich. Back in Amsterdam, the ultra-high vacuum FAMoS k-space microscope is on-line and has world-beating performance, so right now is an exciting time to join in....

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Group Leader. Van der Waals-Zeeman Institute.
 Staff member. Crystal growth wizard.
 Ph.D. students (Freek from 04/2007)
 M.Sc. students (2006/2007)