Announcement of a MTEX training workshop

"Texture Analysis with MTEX emphasizing EBSD Data Analysis"

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Host and Local coordination: Helmut Schaeben

TU Bergakademie Freiberg, Germany 10-14 March, 2014

THE DEADLINE REGISTRATION IS FEBRUARY 9TH, 2014

Contact: For further information and
Registration contact: schaeben@tu-freiberg.de

Content: This German Mineralogical Society (Deutsche Mineralogische Gesellschaft - DMG) short course will provide a brief introduction into our unique mathematical approach to analyse integral X-ray, neutron or synchrotron diffraction pole intensity data as well as individual orientation data from EBSD, Ice Fabric Analyser or optical universal-stage, and hours of hands-on exercises with Windows/Mac/Linux systems applying our free and open Matlab toolbox MTEX for texture analysis (http://code.google.com/p/mtex/) . In particular, estimation of an ODF and its properties as harmonic coefficients, volume portions, texture index, entropy, calculation of anisotropic properties, etc. from either kind of data and grain reconstruction form EBSD data will be included. Once grains are reconstructed, MTEX provides functions towards a comprehensive fabric analysis as envisioned by Sander including various misorientation distributions.

Lecturers will be David Mainprice (Géosciences, Université Montpellier 2, France) and Helmut Schaeben (TU Bergakademie Freiberg), the language of the lectures will be English. Florian Bachmann, Freiberg, will join them to supervise the hands-on exercises. The exercises will provide an introduction into the functions of MTEX and ample opportunities of guided and supervised learning by doing practical applications including
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- crystal and sample geometries: crystal and sample symmetries, different Euler angle conventions, import from crystallographic information files (CIF);

- pole-figure analysis: 20 data formats, data correction;

- pole-figure to ODF inversion: all symmetries, any sampling of pole figures including irregular grids, incomplete and non-normalized pole figures, ghost-correction option, zero-range option;

- EBSD data analysis: 8 data formats, 2D or 3D data, data correction;

- grain modelling: fabric analysis, misorientation analysis;

- ODF estimation from EBSD data: automatic determination of kernel width, arbitrarily many individual orientations;

- ODF analysis: modal orientations, difference ODFs, volume portions, entropy, texture index, Fourier coefficients;

- ODF modeling: any composition of uniform, unimodal, fibre and Bingham ODFs, simulation of pole-figure and individual-orientation data;

- material-property tensors: average tensors from EBSD data and ODFs;

- 2^{nd}-rank tensors: electrical conductivity, dielectric susceptibility, thermal conductivity, thermal expansion and magnetic susceptibility

- 3^{rd}-rank piezoelectricity tensors: piezoelectric (strain) tensors ***d*** and ***g*** and (stress) tensors ***e*** and ***h***, the direct and converse effect, longitudinal and transverse surfaces, and the hydrostatic effect.

- 4^{th}-rank elasticity tensors: elastic stiffness tensor, elastic compliance tensor, Young's modulus, shears modulus, Poisson's ratio, linear compressibility, compressional and shear elastic-wave velocities.

Prerequisites: The course is aimed at master or PhD students but is also open to postdoctoral researchers. Participants should have a basic background in mineralogy, crystallography or solid-state physics. The number of participants will be limited to 15. The official course language is English.

ECTS (European Credit Transfer System): Participants may obtain 2 ECTS credit points after completion of the course and after passing a written examination. For students who do not wish to obtain an ECTS certificate, the examination is not required.

Fees: The course fee will be Euro 70, which covers the course materials and refreshments during the course. We will help to find reasonably priced accommodation. The course receives financial support by German Mineralogical Society (Deutsche MineralogischeGesellschaft-DMG). Non-Freiberg student members of DMG are eligible for travel support to the amount of Euro 50.

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