

## HITEC Methods Day

**Title:** X-Ray methods in materials research  
**Date:** November 15, 2013  
**Time:** 9:00 – 17:30 o'clock  
afterwards *get together* with snacks and drinks  
**Location:** Forschungszentrum Jülich ► Build. 14.6, R 241

Since the 1960's the application of X-Ray methods in materials research was and still is increasing. Nowadays a broad variety of methods is available for nondestructive as well as destructive microstructure analysis in metals and ceramics as well as in compound materials. Actually, at most materials research institutes X-ray diffraction equipment for stress and phase analyses, energy dispersive X-Ray spectroscopy (EDX) in electron microscopes to determine chemical composition with high precision and even X-ray tomography for non-destructive defect analyzes down to a resolution in the micrometer range is available according to the state-of-the art. For non-destructive, high-resolution defect analyzes and measurement of the 3-D stress state, similar methods are used together with high-energy synchrotron radiation sources.

The seminar will give an overview on the fundamentals as well as application examples of X-Ray based analysis of stresses, phases and chemical composition as well as on X-Ray tomography.

### You will learn about:

- Stress analysis by X-Ray diffraction
- Phase analysis by X-Ray diffraction
- Chemical analyses using electron microscopy together with EDX
- X-Ray microtomography

### Contents:

- X-Ray diffraction based stress and phase analysis
- Chemical analysis by EDX in scanning and transmission electron microscopy
- X-Ray microtomography
- Neutron methods in materials research
- Application examples and lab tour (ZEA-1)

### Who should attend:

HITEC Ph.D.-fellows;  
Postgraduate-, Ph.D.- and postdoctoral fellows from the fields of energy and climate research

### **HITEC Days**

HITEC Days are an inherent part of the graduate school Helmholtz Interdisciplinary Doctoral Training in Energy and Climate Research (HITEC). They devote a whole day to a method or a scientific topic with lectures and discussions. The methodological days serve to encourage scientific interdisciplinarity and will enable the PhD students to extend their range of methods with respect to their own scientific work. HITEC Days always end with a 'Get together', some snacks and drinks. HITEC Days are open for HITEC Ph.D. students and other interested young scientists.