

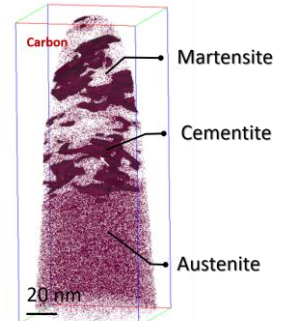
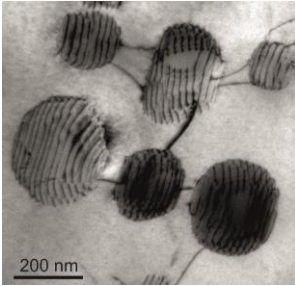
# LECTURE ANNOUNCEMENT SS 2024

## Scanning and Transmission Electron Microscopy / Advanced Characterisation Methods (STEM - ACM)

Fridays, 15.00 – 18.00

Room IC 04/410

Prof. Dr. Tong Li  
apl. Prof. Dr.-Ing. Jan Frenzel  
Dr. rer. nat. Christoph Somsen



The lecture course *STEM - ACM* will be given in the English language. It is aimed at students of the Master's programmes of **Mechanical Engineering** (special subjects: Materials Engineering and Micro-Engineering) and of the Master's programme **Materials Science and Simulation (MSS)**. The lecture course teaches the fundamentals that are essential for correct interpretation of microstructural results from electron-microscopic investigations. Tong Li will cover, in the **first part** of the course, the structure of matter, important crystallographic methods and the interaction between electrons and solids. In the **second part** of the course, Tong Li will introduce atom probe tomography (APT) and demonstrate how APT can be correlated with other microscopy techniques. In the **third part** of the course, Jan Frenzel will present the fundamentals and applications of scanning electron microscopy (SEM). Special emphasis will here be placed on orientation imaging microscopy (EBSD). In the **fourth part**, Christoph Somsen will explain the structure of a transmission electron microscope (TEM) and introduce contrast theory and analytical electron microscopy. In four exercises, integrated into the lecture plan, the subject matter will be consolidated and illustrated with practical examples.

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|------|----------------|---|
| (1)  | 19. April 2024 | Crystals and waves  |
| (2)  | 26. April 2024 | Crystallographic techniques and working with orientations           |
| (3)  | 03. May 2024   | Principles of atom probe tomography (APT)                           |
| (4)  | 10. May 2024   | APT data analysis and correlative APT                               |
| (5)  | 17. May 2024   | Exercise I  |
| (6)  | 24. May 2024   | no lecture  |
| (7)  | 31. May 2024   | Principles of scanning electron microscopy (SEM)                    |
| (8)  | 07. June 2024  | no lecture  |
| (9)  | 14. June 2024  | no lecture  |
| (10) | 21. June 2024  | Basics of orientation analysis in the SEM (EBSD)                    |
| (11) | 28. June 2024  | Exercise II   |
| (12) | 05. July 2024  | Key elements of transmission electron microscopy (TEM)              |
| (13) | 12. July 2024  | TEM diffraction contrast and analysis of defects and analytical TEM |
| (14) | 19. July 2024  | Exercise III  |

### Teaching assistants responsible for this course:

Dr.-Ing. Alireza Basir Parsa, ICFO 05/313

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