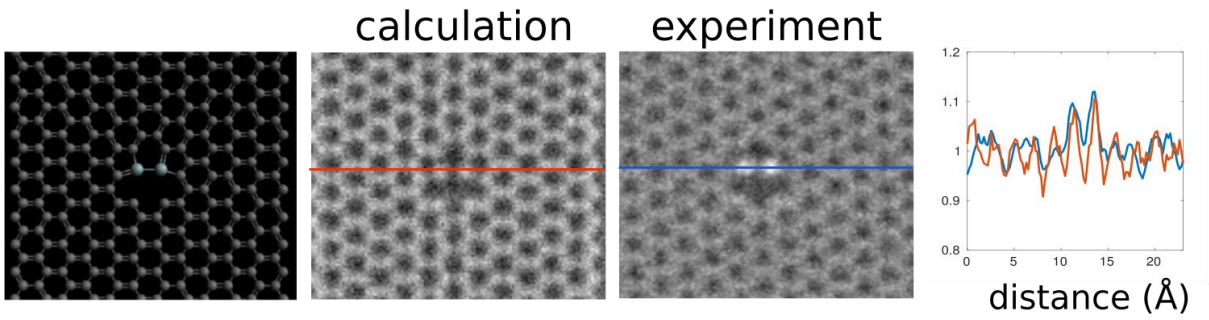
Search for the Stobbs factor

Master Thesis, Electron Microscopy Group of Materials Science, Prof. Ute Kaiser

Background

Stobbs factor describes the disagreement between experimental and simulated HRTEM simages. This disagreement makes a solid interpretation of experimental image by simulations difficult. Attempts have been made to explain the origin of Stobbs factor (for review see [1]). With all the proposed factors in the imaging model included [2], the mismatch between experiments and calculations for 2D materials has been extinguished and largerly reduced. However, discrepancy still exists when we compare the defects in calculated and experimental images. This can be due to, for example, experimental noises which are not considered in the calculations [3, 4].



Aim

Incorporate new factors in the current imaging model and try to extinguish the Stobbs factor for HRTEM images of 2D materials with defects.

Workplan

- Understand the imaging process with the help of image simulation.
- Read literatures about noise mechanisms and try to incorporate possible noises in the current imaging model.
- Compare the experimental and simulated image contrast. If a 100% match is not reached, propose possible reasons.

Requirements

- Good understanding in physics
- Experience in programming
- Strong motivation to work in our team.

Supervisor: Dr. Felix Börrnert, Dr. Zhongbo Lee

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[1] A. Howie *Ultramicroscopy* **98:** 73-79 **(**2004)
[2] A. Thust *Phys. Rev. Lett.* **102**: 220801 (2009)
[3] T. Niermann, A. Lubk, F. Röder. *Ultramicroscopy* **115**:68-77 (2012)
[4] A. Lubk, F. Röder, T. Niermannc, C. Gatela, S. Jouliea, F. Houdelliera, C. Magénd, M.J. Hÿtch *Ultramicroscopy* **115**:78-87 (2012)

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