

Master project in image analysing of perovskite grain formation

Organic-inorganic perovskites (ABX_3) are promising materials for a variety of optoelectronic applications. The solar cells have a certified power conversion efficiency exceeding 25%. Nevertheless, state-of-the-art films still contain performance-limiting non-radiative recombination sites and exhibit a range of complex dynamic phenomena under illumination that remain poorly understood. We have been investigating grain formation with transmission electron microscopy and found that cubic grains which seems exactly the same first have variations in sharpness in angles which stems from reactions inside a core shell. Now, we would like to try to sort different grains out by using image analysis.

The task is to design and evaluate an image analysis and machine learning pipeline, which learns from the collected and annotated images with different parameter settings. The idea is to be able to recognise different parameters from sample images to be classified. In this way we could quantify how efficient our materials are by varying different parameters in the synthesizing rout.