

SCIENTIFIC REPORT

Visit of Bob Rutten (Universiteit Hasselt) during the period: 16/08-28/08/2009 (13 days)

Host Institute: Lund University, Lund, Sweden

Scientific topic: Quantum dots and energy conversion on the nanometerscale

The main purpose of the visit was to gain knowledge in the field of nanowire quantumdots and to study their applications to energy conversion. The research group led by professor Hongqi Xu at the Nanometer Consortium in Lund, Sweden has a renowned expertise in this field which provided an excellent learning environment. The second purpose of the visit was to attend the four-day summer course, “Quantum Mechanics for Modern Devices”, given by David Ferry on this topic.

During my stay, I had various fruitful discussions with Hongqi and several of his coworkers including Frederik Boxberg and Heiner Linke. I was guided through the labs and part of the cleanrooms to develop more feeling with the experimental side of nanometerscale devices. Together with Hongqi we developed a new idea for a nano-sized solar cell based on a double quantum dot. The feasibility of the principle is presently under investigation, and will lead to a future collaboration. Possible future visits are not excluded, since next year Prof Xu will be organizing a workshop on such applications of quantum dots, to which I was already informally invited.

During a group seminar, I presented my own research on a theoretical study of the performance of a nano-scale solar cell, and I attended a seminar of Prof. Howard Jackson of the University of Cincinnati on photonic and electronic applications of semi-conductor nanowires.

Alltogether, it was a very interesting visit that certainly contributed a lot to my specific knowledge of the research topic, but it also provided a great learning experience as a scientist in general.