The Faculty of Science, Leiden Institute of Physics is looking for a:

PhD candidate, Real-time probing of charge mobility in trap-free organic nanodevices

Key responsibilities

The PhD candidate will study the mechanism of charge transport through 'ideal' organic layers, by probing electron mobility from the nanoscale to the macroscale. This will allow us to accurately test charge transport models in the cleanest limit possible.

Two state-of-the-art methods will be combined in this PhD project: a) LEEM (low-energy electron microscopy), and b) single-molecule spectroscopy. Within our LEEM system, the PhD candidate will grow layers of organic molecules with maximal order and minimal trapping (following our 'lab-inside philosophy'). To investigate their properties, conventional conductance measurements will be combined with LEEM-based potentiometry and single-molecule spectroscopy. The latter will provide dynamical information on the mobility of single electrons. Hence, within the project the gap between the macro- and nanoscales will be bridged, allowing the PhD candidate to obtain unique information. This will allow us to test comprehensive model theories for organic electronics. The PhD candidate will be part of both the Van der Molen group (LEEM) and the Orrit team (single-molecule spectroscopy), in Leiden. Support on the theory side is provided by the Blaauboer group (Delft).

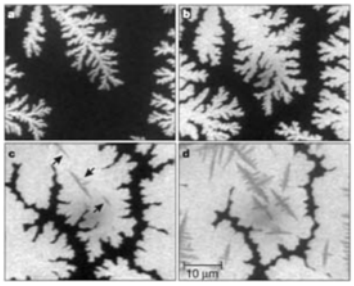

Fig. 1 *Live imaging* of organic layer-by-layer growth in LEEM/PEEM* allows for real-time feedback to optimize growth conditions. {Tromp et al.].

Selection Criteria

We are looking for a talented PhD-student with excellent experimental skills and a curiosity-driven mindset. So, if you are a physicist or a nanoscientist with an affinity for (quantum) charge transport and/or condensed matter physics, feel free to request information and/or to apply.

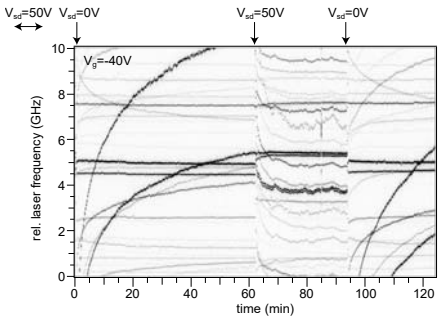

Fig. 2 *Live imaging* of single charge dynamics enables detailed studies of transport on the nanoscale. For this, electronic transitions of single DBT-molecules in an anthracene lattice are monitored optically. The kinetics above results from hopping between traps in the *imperfect* 3D-crystals used in 2007 (A. Nicolet, PhD-thesis, Leiden).

Research at our Faculty/Institute

The Faculty of Science is a world-class faculty where staff and students work together in a dynamic international environment. It is a faculty where personal and academic development are top priorities. Our people are driven by curiosity to expand fundamental knowledge and to look beyond the borders of their own discipline; their aim is to benefit science, and to make a contribution to addressing the major societal challenges of the future.

The research carried out at the Faculty of Science is very diverse, ranging from mathematics, computer science, astronomy, physics, chemistry and bio-pharmaceutical sciences to biology and environmental sciences. The research activities are organised in eight institutes. These institutes offer eight bachelor's and twelve master's programmes. The faculty has grown strongly in recent years and now has more than 1,300 staff and almost 4,000 students. We are located at the heart of Leiden's Bio Science Park, one of Europe's biggest science parks, where university and business life come together.

For more information, see www.universiteitleiden.nl/en/science and http://workingat.leiden.edu.

Terms and conditions

We offer a full-time one year term position with the possibility of three-year renewal after a positive evaluation. Salary range from € 2,222,- to € 2,840,- gross per month (pay scale P, in accordance with the Collective Labour Agreement for Dutch Universities).

Leiden University offers an attractive benefits package with additional holiday (8%) and end-of-year bonuses(8.3 %), training and career development and sabbatical leave. Our individual choices model gives you some freedom to assemble your own set of terms and conditions. Candidates from outside the Netherlands may be eligible for a substantial tax break.

All our PhD students are embedded in the Leiden University Graduate School of Science www.graduateschools.leidenuniv.nl . Our graduate school offers several PhD training courses at three levels: professional courses, skills training and personal effectiveness. In addition, advanced courses to deepen scientific knowledge are offered by the research school.

Diversity
Leiden University is strongly committed to diversity within its community and especially welcomes applications from members of underrepresented groups.

Information
Enquiries or any questions about the procedure can be made to Dr. ir. Sense Jan van der Molen, Assoc. Prof. molen@physics.leidenuniv.nl, phone +31-(0)71-5275461 or to Dr.. Michel Orrit, Full Prof. orrit@Physics.LeidenUniv.nl, phone +31-(0)70 5271720.