



Device physics researcher – PhD candidate

Simbeyond is looking for a talented Master's student with knowledge of semiconductor physics and interest in organic electronics and simulations, to join our young and dynamic team in Eindhoven. This position offers the possibility to work towards a PhD degree in an international and industry-relevant EU-funded project on the *addressing the challenges of high-performance solution-processed OLEDs using sustainable materials (TADF solutions)* under the supervision of prof. Anna Koehler at the Bayreuth University, in collaboration with Simbeyond. The project will take place for the first period in Eindhoven, The Netherlands and then continue in Bayreuth, Germany.

The position involves the following responsibilities:

- Developing new models for charge transport, excitonics and degradation mechanisms in organic electronic devices
- Implementing the models in high performance scientific simulation software
- Exploring new application areas for existing simulation software
- Giving presentations at conferences and expositions

The ideal candidate has the following skills:

- Background in Organic Electronics or semiconductor physics and specifically device physics
- Affinity with computational physics and Monte Carlo simulation methods
- Proficiency in English both in written and verbal form is a must
- Some experience with C++ programming
- Some experience with Bash scripting, Python scripting and notebooks, and UNIX/Linux in general is a plus
- Experience with writing in AsciiDoc and Latex is a plus

Research challenges:

Organic light-emitting diodes, OLEDs, are now the must-have displays in mobile phones, televisions and medical displays. All these displays are still based on fluorescent blue emitters, which are 75% less efficient than phosphorescent blue emitters. Unfortunately, after more than 10 years of development, no long lifetime, stable blue phosphorescent emitter has been demonstrated to meet commercial performance targets.

However, a new generation of OLED emitter has emerged, based on thermally activated delayed fluorescence (TADF). Like phosphorescence, TADF is a 100% efficient mechanism for converting triplet states into emissive singlet excited state, thereby enabling 100% internal quantum efficiency. Recent rapid advances have shown that deep blue emission with external quantum efficiency (EQE) above 22% is possible, and coupled with enhanced out-coupling through self-orientation of emitter molecules, combined with low refractive index transport layers can boost EQE above 40%. This creates a step change for OLEDs.

In this research project detailed device studies in terms of materials and architecture and their effects on a range of device performance parameters and lifetime will be made. From the library of results generated, detailed electrical models will be developed using kinetic Monte Carlo simulations. From this model, various degradation scenarios will be studied to determine their effects and direct spectroscopic measurement to verify the model predictions. In this way lifetime predictions will elucidate the key degradation mechanisms in an OLED and result in a set of design rules for TADF-OLED stacks with optimal efficiency and lifetime.

Requirements:

Candidates have a Master's degree in (Applied) Physics, Chemistry or related fields and experience in the field of organic electronics, semiconductor physics or optics, preferably using simulation tools. Strong presentation and writing skills are required, as well as a quality mindset and good problem-solving skills. The candidate should be fluent in English, both in written and verbal form and should not have lived in The Netherlands or Germany for more than 12 months in the last 3 years. This position requires to live for 18 months in Eindhoven, The Netherlands, and then another 18 months in Bayreuth, Germany. Willingness to travel and an entrepreneurial predisposition are qualities we regard highly for this position.



Who we are:

Simbeyond accelerates development of advanced materials and high-tech devices as used in state-of-the-art display, lighting and signage applications. We provide an unprecedented software tool for the development of organic electronic devices, such as OLEDs, that replaces a large part of the costly and time-consuming experimental efforts with computer simulations. The unique approach provided allows our customers to analyze, predict and improve device performance. This leads to a shorter time-to-market and to reduced R&D costs for the electronic devices of today and tomorrow.

What we offer:

We offer an exciting opportunity to join a young and dynamic environment in Eindhoven, the Brainport of The Netherlands, in a team of driven professionals. This position includes international training opportunities within the EU project consortium, as well as the possibility of pursuing a PhD degree from one of the top universities in Europe. Our informal company culture gives ample opportunity for personal and professional development. At the same time, you will be helping to shape our fast-growing business. Are you the new team member we are looking for? Send your CV and motivation letter to jobs@simbeyond.com. For more information, visit www.simbeyond.com.