Ph.D. student scholarship offer under NCN OPUS project

Project title: “Artificial molecules in nanowires: atomistic calculations of excitonic spectra and machine learning”

Project leader: Michał Zieliński, prof. UMK.

Project description:

We intent to formulate theoretical description and perform challenging atomistic calculations of excitons confined in artificial molecular systems formed by quantum dots embedded in semiconductor nanowires. Contrary to real atoms in vacuum, quantum dots in nanowires are surrounded by a complicated multi-million atom crystal environment, rendering modelling of nanowire quantum dots a truly challenging task. Understanding the details of excitonic spectra in nanowire quantum dot molecules is important for potential applications in quantum information and nanophotonics. The goal of the project is to develop theory and run highly demanding atomistic calculation for a family of nanowire-embedded artificial molecules.
We will combine machine learning and atomistic approaches to solve the inverse problem of matching quantum dot molecule spectra to its morphology.

Qualification criteria:

- **An active doctoral student status/participant of doctoral studies/school in Poland (as of Oct 1st, 2021)**
- Master’s degree in physics or chemical sciences or related.
- Enthusiasm for science and commitment to hard work
- Good computer programming skills
- Good knowledge of English
- Basics knowledge of solid states physics

Responsibilities/Tasks:

- Development of theoretical approaches aiming for a computationally efficient description of electron-hole interaction in nanostructures
- Development of a theory using machine learning approach; tests and building of an initial library of results for single-crystal phase quantum dots
- Atomistic, machine-learning supported, calculations of quantum dot molecules in different spatial configurations
- Writing scientific papers and PhD thesis; auxiliary calculations

Application deadline: **2021-08-31, 23:59**

Remuneration: negotiable stipend starting from 2000 PLN (no tax) monthly

Period of contract/stipend agreement: 12 months (possible extension up to a total of 36 months).

Documents required:

- CV/resume
- cover letter

Please send your CV and cover letter to: mzielin@fizyka.umk.pl

The recruitment committee reserves the right to interview (via ZOOM) only the selected candidates (the candidates will be informed about the interview by e-mail).