

Juryreport

Lorentz Afstudeerprijs voor Theoretische Natuurkunde 2019

S. (Stefano) Polla MSc, Universiteit Leiden

Quantum Digital Cooling

One of the fundamental problems in the design of quantum algorithms is the preparation of the initial state of a quantum computation. Ideally, this is the lowest energy ground state, a state that is difficult to achieve by simple physical cooling. The laureate largely independently developed a digital protocol, termed Quantum Digital Cooling, that can be used to drive a series of qubits to the ground state. This theoretical research project performed in Leiden has immediate impact on small quantum computing networks that are currently being developed in experimental groups in Delft. It is expected that the innovative digital protocol developed by the laureate can in fact be tested on these prototype quantum circuits, thereby contributing in a significant way to an important and fast developing research field. A scientific publication based on the laureate's work is in preparation. The laureate received an exceptional mark of 10 for his research project, and furthermore achieved an astonishing grade point average of 9.53 for his M.Sc. program leading to a "summa cum laude" distinction. The laureate further stands out in scientific maturity as he successfully defended his own research proposal for a 4-year PhD project at the Casimir Research School in Delft and Leiden.

The jury was greatly impressed by the scientific quality of the laureate's M.Sc. thesis and the expected impact of his work on the field. The jury therefore considers the laureate a very worthy recipient of this years "Lorentz Afstudeerprijs voor Theoretische Natuurkunde".

Prof. dr. A.M. (Marileen) Dogterom, hoogleraar bionanoscience Technische Universiteit Delft
Prof. dr. ir. M.C.M. (Richard) van de Sanden, directeur FOM-Instituut DIFFER, hoogleraar lage temperatuur plasmafysica en chemie Technische Universiteit Eindhoven

De jury vergaderde op 11 oktober 2019 onder leiding van Mr. R.E. Rogaar, directeur KHMW. Daarnaast waren ter vergadering aanwezig Prof. dr. A.P. IJzerman, secretaris natuurwetenschappen, en S. de Boer.