

Call for Applications:

PhD position in philosophy of physics / metaphysics of science

University Grenoble Alpes

The Chair of Excellence in Philosophy of Quantum Physics in Grenoble solicits applications for a 3-year PhD position attached to the Chair within the interdisciplinary project ‘The entanglement of physics and philosophy’ starting 1 January 2019 (please see below for more information on the project). The Chair is part of the Cross Disciplinary Program ‘Quantum Engineering Grenoble’ (QuEnG), which aims to foster a pluridisciplinary environment for quantum technologies in Grenoble; more information on the QuEnG project and the Chair of Excellence can be found at <https://quantum.univ-grenoble-alpes.fr/> and <https://quantum.univ-grenoble-alpes.fr/fostering-the-ecosystem/our-chairs-of-excellence/philosophy-of-quantum-physics/lam-vincent-734540.htm?RH=1494950443893>

The successful applicant will conduct her or his doctoral research in relation to the project under the co-supervision of Vincent Lam (Chair holder, main supervisor), Cyril Branciard (Institut Néel UGA) and Stéphanie Ruphy (PPL UGA / Lyon 3), in close collaboration with the physicists of the Quantum Foundations Group in the Institut Néel and with enrolment in the philosophy doctoral program in Grenoble. She or he will be part of the QuEng Junior Board, and expected to actively participate to the events organized by the Chair and the QuEnG collaboration.

Applicants with relevant background in philosophy of physics (quantum physics, spacetime theories) and/or metaphysics of science (causation, structural realism) and/or quantum foundations will be preferred.

Applicants should send a cover letter, a CV and a one-page research statement describing the doctoral research to be pursued within the project. The applications as well as 2 reference letters should be sent to Vincent Lam (vincent.lam@unige.ch) and Cyril Branciard (cyril.branciard@neel.cnrs.fr) (the reference letters should be directly sent by the persons writing the letters). Review of the applications will start on 1 March 2018 and will continue until the position is filled.

The application is a 2-step process: the selected applicant will have to apply to the QuEnG PhD programme with the support of the Chair (see <https://quantum.univ-grenoble-alpes.fr/join-us/phd-programmes/call-phd-2018-queng-716820.htm?RH=1494950391766>).

Applications from women and underrepresented minorities are explicitly encouraged.

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The entanglement of physics and philosophy

This research project aims to articulate the interplay between fundamental physics and metaphysics in the context of the foundations of quantum theory, with a strong focus on quantum entanglement and its relationship to spacetime and causal structures. We will investigate the fundamental features (structures) of the world---in particular regarding its spatio-temporal and causal aspects---quantum entanglement is pointing at, across the main realist quantum ontologies and across the main quantum theoretical frameworks, from non-

relativistic quantum mechanics to quantum field theory on curved spacetimes and various approaches to quantum gravity. The goal is to develop a global perspective on quantum entanglement, taking into account hints from various (quantum) theoretical frameworks. We will pay particular attention to the suggestions about the quantum entanglement structure being ontologically on a par or even more fundamental than the spacetime structure. Accordingly, we will specifically investigate from a global conceptual perspective recent work in quantum foundations on indefinite causal/temporal order (where quantum correlations violate some causal inequalities) and in quantum gravity (in particular loop quantum gravity) on the status and role of quantum entanglement beyond the (classical) spacetime structure.

These investigations aim to provide a much needed concrete case study for the interplay between physics and metaphysics, highlighting how genuine---somehow 'symmetric' or 'balanced'---interactions between the two may be fruitful both for our metaphysical conceptions of the physical world as well as for physical theorizing itself.