

The Jury has considered the submissions for the Hanneke Janssen Memorial prize 2014 and has decided to award the prize to Benjamin Feintzeig, at the University of California, Irvine, for his papers "Hidden Variables and Incompatible Observables in Quantum Mechanics" and "Can the Ontological Models Framework Accommodate Bohmian Mechanics?" which were submitted as part of his portfolio to obtain his MA degree.

In the opinion of the jury, this work showed remarkable competence and an original approach to problems in the interpretation of quantum theory.

The first paper "Hidden Variables and Incompatible Observables in Quantum Mechanics" takes up a controversial issue in the assessment of John Bell's famous theorem that is commonly taken to exclude any local hidden-variables interpretation of quantum theory. This common assessment was challenged in 1982 by Arthur Fine, who argued that Bell's theorem did not mitigate against locality, but relied instead on the assumption that incompatible quantities in quantum theory would jointly have definite values in a hidden-variables theory. In order to substantiate his claim, Fine showed that the inequalities of Bell's Theorem could also be derived by merely assuming that the hidden variables theory assigned joint values to (quantum-mechanically) incompatible quantities, without ever making an assumption about locality.

Feintzeig deserves merit for being the first to consider the converse question: If we avoid the assumption that quantum-mechanically incompatible quantities have joint values in a hidden variables interpretation, can we thereby avoid the conclusions of Bell's theorem? His paper addresses this question by developing the notion of a generalized probability space, in which this assumption is avoided, and then shows that under mild assumptions, a hidden-variables reconstruction of quantum theory is still excluded. In the eyes of the jury this represents important novel progress in the interpretation of quantum theory, exceeding what could be expected from a Master's student. Indeed, by developing the notion of generalized probability spaces it opens up an entirely new topic of investigation on which one may expect new and further results when this notion is recognized in the literature.

Feintzeig's second essay "Can the Ontological Models Framework Accommodate Bohmian Mechanics?" deals with a recent approach in the foundations of quantum theory which is usually known by the name of "ontological models". Authors working in this approach typically present models that reproduce at least part of the quantum mechanical predictions, and thus elucidate the prospects of any future interpretation of quantum theory adopting an underlying level of ontological or hidden-variables theory. Feintzeig's paper shows that these authors diverge from the very start from the assumptions of the oldest hidden-variables theory ever developed, Bohmian mechanics. This paper is one that, in the opinion of the jury, needed to be written. And Feintzeig's paper admirably shows competence and mastery of the field. We also mention that both of these papers have already been accepted for publication in prominent journals, the first in the *British Journal for the Philosophy of Science*, and the second in *Studies in the History and Philosophy of Modern Physics*.

Nijmegen, 24 november 2014

Prof. Dr. Jos Uffink
Prof. Dr. Klaas Landsman
Dr. Christopher Lehner
Dr. Michiel Seevinck