Title:	Envariance, Born's Rule and Inferences from Correlations
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Abstract:	The thesis is divided into two main chapters, which are independent pieces of re- search and establish different results, separately. In the first chapter, we discuss the article tilted "Quantum Theory cannot consis- tently describe the use of itself" which, based on a gedankenexperiment designed on Wigner's Friend paradox, questions the universal validity of Quantum Theory and establishes that different observers can draw predictions which are incon- sistent with the predictions of Quantum Theory. The basis for predictions are inferences of observers, about other's measurement outcome, from unique corre- lations. We show, that such inferences based on correlations in an entangled state, possesses some other inconsistencies, which we have discussed. In the second chapter, we discuss Zurek's work on environment-induced invari- ance or Envariance. We briefly present his derivation of quantum mechanical Born's Rule, based on swapping of states using envariance. Firstly, we show the problems with Zurek's derivation, which isn't justified even after assuming envariance. Secondly, we show that envariance is not a property of maximally entangled pure states alone, as maximally correlated mixed states, by definition, are also envariant, which arise in the situations having just classical correlation. This establishes that envariance is not a consequence of entanglement, but instead a consequence of correlations which can even be classical. We show, envariance is just another term for a property known as rotational invariance, which is exhib- ited by maximally correlated mixed and pure states, both; and thus doesn't lead to objective probabilities as such, as claimed by Zurek. In the third chapter, we reflect upon the results briefly and discuss their impli- cations; and finally discuss some future perspective they have given, to pursue further research on.
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