Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Quantum Mechanics in Terms of Symmetric Measurements**

CHRISTOPHER FUCHS, Bell Labs, Lucent Technologies — In the neo-Bayesian view of quantum mechanics that Appleby, Caves, Pitowsky, Schack, the author, and others are developing, quantum states are taken to be compendia of partial beliefs about potential measurement outcomes, rather than objective properties of quantum systems. Different observers may validly have different quantum states for a single system, and the ultimate origin of each individual state assignment is taken to be unanalyzable within physical theory—its origin, instead, comes from prior probability assignments at stages of physical investigation or laboratory practice previous to quantum theory. The objective content of quantum mechanics thus resides somewhere else than in the quantum state, and various ideas for where that "somewhere else" is are presently under debate. What is overwhelmingly agreed upon in this effort is only the opening statement. Still, quantum states are not Bayesian probability assignments themselves, and different representations of the theory (in terms of state vectors or Wigner functions or C*-algebras, etc.) can take one further from or closer to a Bayesian point of view. It is thus worthwhile thinking about which representation might be the most propitious for the point of view and might quell some of the remaining debate. In this talk, I will present several results regarding a representation of quantum mechanics in terms of symmetric bases of positive-semidefinite operators. I also argue why this is probably the most natural representation for a Bayesian-style quantum mechanics.

Christopher Fuchs
Bell Labs, Lucent Technologies

Date submitted: 29 Nov 2005

Electronic form version 1.4