Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Axioms and Measurements PER ARVE, Retired — The traditional postulates of quantum mechanics are formulated to mainly suit the Copenhagen interpretation. They are not suited for the Many-Worlds interpretation. Often, it has been assumed that MWI needs no postulates, but the mathematics alone can never constitute a physical theory. There have to be some rules for how the mathematical entities are related to our observations. Two axioms have been newly proposed. In short, postulate 1) The state are square normalizable. Where the particle is, is given by a distribution, which is given by the absolute square of the state; 2) The state time evolution is continuous and unitary and all interactions are spatially local. From the postulates, it can be derived that the state is a vector in Hilbert space. It can also be seen that experiments that are properly set up can measure the eigenvalues of Hermitian operators. The probability recipe as was given by Born need not be a part of the axioms in the Many-Worlds interpretation but can be derived from the given axioms. Many previous attempts to derive the probability rule has been forced to use subtle and less convincing argumentation as they were based on intuition rather than well-defined postulates.

Per Arve
Retired

Date submitted: 11 Nov 2016 Electronic form version 1.4