

GRW as an ontology of dispositions

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Abstract

The paper argues that the formulation of quantum mechanics proposed by Ghirardi, Rimini and Weber (GRW) is a serious candidate for being a fundamental physical theory and explores its ontological commitments from this perspective. In particular, we propose to conceive of spatial superpositions of non-massless microsystems as dispositions or powers, more precisely propensities, to generate spontaneous localizations. We set out five reasons for this view, namely that (1) it provides for a clear sense in which quantum systems in entangled states possess properties even in the absence of definite values; (2) it vindicates objective, single-case probabilities; (3) it yields a clear transition from quantum to classical properties; (4) it enables to draw a clear distinction between purely mathematical and physical structures, and (5) it grounds the arrow of time in the time-irreversible manifestation of the propensities to localize.

Keywords: dynamical reduction models, causal properties, dispositions, localizations, propensities, primitive ontology, time arrow

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