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Particles in a process. Bohmian dispositions and the ‘no successor problem’

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Abstract

The primitive ontology approach to Bohmian mechanics seeks to account for quantum phenomena in terms of a particle configuration that follow continuous trajectories through space and a law of nature that describes their temporal development. This approach to explaining quantum phenomena is compatible in principle with a powerist account of laws. In this paper, however, we argue that powerist models that endow the particles with ‘Bohmian dispositions’, which are stimulated according to their instantaneous configuration, are subject to the ‘no successor’ problem: either time is discrete, or the powers of the configuration do not underwrite change. What is needed, we suggest, is for the cosmos as a whole to have a power to manifest a temporally extended process, which is metaphysically prior to any constituent sub-processes or instantaneous particle configurations, in which the Bohmian particles are directed to follow certain trajectories.