

Abstract Submitted
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Ordering relations for quantum states¹ IAN DURHAM, Saint Anselm College — It is often desirable to model physical states in an order-theoretic manner, e.g. as a partially ordered set. Classical states are known to possess a unique ordering relation corresponding to a neo-realist interpretation of these states. No such unique relation exists for quantum states. This lack of a unique ordering relation for quantum states turns out to be a manifestation of quantum contextuality vis-à-vis the Kochen-Specker theorem. It also turns out that this provides a link to certain large-scale thermodynamic processes. The suggestion that the ordering of quantum states leads to macroscopic thermodynamic processes is at least five decades old. The suggestion that the mechanism that drives the ordering is contextuality, is unique to this work. The argument is framed in the language of the theories of domains, categories, and topoi.

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