Is Mathematical Rigor Necessary In Physics?

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Abstract

Many arguments found in the physics literature involve concepts that are not well-defined by the usual standards of mathematics. I argue that physicists are entitled to employ such concepts without rigorously defining them so long as they restrict the sorts of mathematical arguments in which these concepts are involved. Restrictions of this sort allow the physicist to ignore calculations involving these concepts that might lead to contradictory results. I argue that such restrictions need not be ad-hoc, but can sometimes be justified by considering some of the metaphysical issues surrounding the question of the applicability of mathematics to physical reality.

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