A Puzzle about Laws, Symmetries and Measurability

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Abstract

I describe a problem about the relations among symmetries, laws, and measurable quantities. I explain why several ways of trying to solve it will not work, and I sketch a solution that might work. I discuss this problem in the context of Newtonian theories, but it also arises for many other physical theories. The problem is that there are two ways of defining the space-time symmetries of a physical theory: as its dynamical symmetries, or as its empirical symmetries. The two definitions are not equivalent, yet they pick out the same extension. This coincidence cries out for explanation, and it is not clear what the explanation could be.

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