

The reasonable effectiveness of mathematical deformation theory in physics, especially quantum mechanics and maybe elementary particle symmetries

Daniel Sternheimer

Rikkyo University Kyoto, Japan and Universit de Bourgogne,
Dijon, France

Abstract

In 1960 Wigner marveled about the unreasonable effectiveness of mathematics in the natural sciences, referring mainly to physics. In that spirit we shall first explain how a posteriori relativity and quantum mechanics can be obtained from previously known theories using the mathematical theory of deformations. After a tachyonic overview of how the standard model of elementary particles arose from empirically guessed symmetries we indicate how these symmetries could (very reasonably) be obtained from those of relativity using deformations (including quantization). This poses difficult and interesting mathematical problems with potentially challenging applications to physics.