

No-Go theorems and quantization

Abstract

In this review, we would like to highlight the three known no-go theorems in quantum physics in relation to the process of quantization that maps classical observables to quantum ones. The quantization approach considered is a mixture of Isham's group-theoretic quantization and geometric quantization with special emphasis on underlying compact phase space geometry of spheres. The first is Groenewold-van Hove theorem that states the obstruction of quantizing the full algebra of observables and in the sphere case, only limited to the spin observables plus the constant functions. The other two are theorems of Bell and Kochen-Specker stating that the only hidden variable theories allowed by quantum physics are nonlocal and contextual ones. We give simple examples of these no-go theorems and indicate some interesting problems arising from them for the field of quantization

Keyword: Quantization, Groenewold van-Hove theorem, entanglement, contextuality