

Geometric quantization

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Abstract:

Quantum mechanics is a physical theory that describes nature at the scale of atoms, and one of its fundamental aspects is its relation with classical mechanics, which describes nature at human scales. In his seminal book *principles of quantum mechanics* of 1930, Dirac states general conditions that a quantum dynamical system must satisfy, knowing its classical counterpart. In this talk, I will present one attempt to incorporate these "quantization conditions" into a general mathematical theory, which is the Kostant-Souriau geometric quantization program.

I will start with describing symplectic geometry as a mathematical framework for classical mechanics, and after a brief introduction to the basics of quantum mechanics, I will formulate Dirac's quantization conditions in this framework, following Kostant and Souriau. If time allows, I will then give some applications in complex geometry and representation theory.