

The Logic of Quantum Programs.

Baltag, Alexandru and Smets, Sonja (2004) The Logic of Quantum Programs..

Full text available as:

[PDF](#) - Requires a viewer, such as [Adobe Acrobat Reader](#) or other PDF viewer.

Abstract

We present a logical calculus for reasoning about information flow in quantum programs. In particular we introduce a dynamic logic that is capable of dealing with quantum measurements, unitary evolutions and entanglements in compound quantum systems. We give a syntax and a relational semantics in which we abstract away from phases and probabilities. We present a sound proof system for this logic, and we show how to characterize by logical means various forms of entanglement (e.g. the Bell states) and various linear operators. As an example we sketch an analysis of the teleportation protocol.

Keywords: Quantum Information Theory, Quantum Mechanics, Dynamic Logic, Quantum Logic

Subjects: [Specific Sciences: Computer Science](#)

ID Code: 1799

Deposited By: [Smets, Sonja](#)

Deposited On: 22 June 2004