
GILAD GOUR, University of Calgary, 2500 University Drive NW, Calgary, Alberta, T2N 1N4

On the additivity conjecture in quantum information

Quantum information science, an interface area of mathematics, physics and computing science, is concerned with the manipulation, computation and communication of information, where the information is encoded in two (or more) level quantum systems called “qubits”, unlike classical information, which is encoded in Boolean “bits”. The devices used in this science are governed by the principles of quantum mechanics, which opens the possibility for a large range of applications. In this talk I will discuss the long standing additivity conjecture that the minimum entropy output of a completely positive trace preserving linear map, as measured using the von Neumann entropy, is additive under taking tensor products. After enormous efforts by the most experts in the field during the last 12 years, this conjecture has been recently proven to be false. Here I will present a slight modification to this (false) conjecture and discuss some recent progress and future directions.

This talk is based on a joint work with Shmuel Friedland, Aidan Roy, and Jon Yard.