Quantum Measurements and Information Theory

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A measurement is described by an interaction between an object to be measured and a probe making an entanglement between them and a subsequent local measurement on the probe bringing us the outcome of the measurement and preparing the object in a state conditional upon the outcome. We obtain from the outcome some information on something relative to the system state. In this talk, we will discuss the problem to evaluate the amount of information obtained from the outcome. We consider the most general framework of measurement that gives an exhaustive description of all the possible measurements, evaluate the information on the state before the measurement and the information on the state after the measurement, and show relations between those two kinds of information obtained by measurement. The talk includes a survey of development in the last two decades and some new topics such as error correction and discode.