

Measurement inspired modeling of dynamical systems

Denys Bondar, Renan Cabrera, Andre Campos, and Herschel Rabitz

Princeton University, Washington Rd, Princeton, USA

We will provide an answer to the question: “What kind of observations and assumptions are minimally needed to formulate a physical theory?” Our answer to this question leads to the new systematic approach of Operational Dynamical Modeling (ODM), which allows to deduce equations of motions from time evolution of observables. Using ODM, we are not only able to re-derive well-known physical theories (such as the Schrodinger and classical Liouville equations), but also infer novel physical dynamics (and solve open problems) in the realm of non-equilibrium quantum statistical mechanics.