

Call for Papers

## **The Quantum Reconstruction Program and Beyond**

What it Is, Why it Matters, Where Next?

August 1-3, 2023

University of Graz, Austria

Organizing Team: Philipp Berghofer and Philip Goyal

### **Confirmed keynote speakers**

Michel Bitbol (École Normale Supérieure)

Philipp Höhn (OIST)

Jenann Ismael (Columbia University)

Markus Müller (IQOQI)

Harald Wiltsche (Linköping University)

### **Submission details**

Submissions should not exceed 500 words, must be written in English (conference language), and should be prepared for blind review. Please send your submissions and general inquiries to [philipp.berghofer@uni-graz.at](mailto:philipp.berghofer@uni-graz.at). Women and members of other traditionally underrepresented groups are especially encouraged to apply.

The submission deadline is **April 16, 2023**.

The workshop will be an **in-person event**.

### **Conference summary**

The program of reconstructing quantum theory emerged at the turn of the millennium as a consequence of the booming interest in quantum information. The idea is that progress in our understanding of quantum mechanics can be achieved by deriving the quantum formalism from physical principles. This is to say that instead of treating the quantum formalism as a given and interpreting the *mathematics*, we should be looking for underlying *physical* principles. By now, there exist several successful reconstructions. Typically, they are formulated in an *operational* framework, deriving the quantum formalism from *information-theoretic* principles. The aim of this workshop is to reflect on the philosophical implications of such informational reconstructions, to discuss how the reconstruction program should evolve, and to find synergies to other areas in physics and philosophy that do not explicitly engage in reconstructions.

Topics and questions we want to discuss include but are not limited to:

- 1. The relationship between interpretation and reconstruction.** Are reconstructions themselves in need of interpretation? Are certain reconstructions particularly (in-)consistent with prominent interpretations? For instance, how does the operational framework square with the popular “interpretations without observers” that seek to eliminate the notion of measurement from the quantum formalism?
- 2. The concept of information.** Information for whom and information about what? Should the notion of information be treated as an irreducible component of the quantum formalism? Should information be understood in an ontological sense? Finally, should interpretations that deny that the quantum state represents (our knowledge of) objective reality seek reconstructions that are formulated in terms of non-factive mental states such as belief and experience?
- 3. Synergies.** Can researchers working on classical physics, general relativity, quantum gravity, or metaphysics benefit from insights of the quantum reconstruction program and vice versa?