



Postdoc and PhD positions ERC project Weakly driven quantum symmetries

Jožef Stefan Institute, Ljubljana, Slovenia

Several **postdoc and PhD positions** are open at Jožef Stefan Institute, as part ”**Weakly driven quantum symmetries**” (**DrumS**) ERC project lead by Zala Lenarčič.

The DrumS project will establish a new paradigm for stabilizing exotic non-thermal states by weakly driving quantum many-body systems. Present research theoretically predicts peculiar non-thermal states in fine-tuned models with additional symmetries, for example, in integrable models with macroscopically many conservation laws. However, these models and their exact symmetries cannot be accurately realized in solid-state experiments and even quantum simulators. DrumS aims to show that weak driving can boost the underlying symmetries in realistic setups and substantially affect quantities protected by approximate symmetries to realize exotic transport and other non-thermal quantum properties with potential use in quantum technologies.

The research program will include:

- Demonstrating that a strong response to a weak drive is a generic property of setups where driving compensates for weak symmetry breaking perturbations and stabilizes large expectation values of potentially useful quantities.
- Promoting the practical significance of fascinating idealized models, such as integrable, many-body localized, and lattice gauge theories. Driving protocols will compensate unavoidable integrability and gauge breaking to realize peculiar energy, spin and particle transport or synchronize resonant states into a superconducting or quantum scarring response.
- Growing a new branch of non-linear phenomena, with exciting possibilities for realization in condensed matter experiments and synthetic quantum simulators.
- We will employ and develop analytical (hydrodynamics) as well as numerical (tensor network, machine learning) approaches for open driven systems, depending on the preference of the candidate. For the postdoc positions, a specialization on these techniques will be advantageous.

The starting date is negotiable, preferably in the summer or autumn of 2023. The appointment is for 4 years for the PhD position and for 2+1 years for the postdoc positions.

The deadline for application is February 28th 2023, however, the applications will be considered as they are received and until the positions are filled, even after the deadline. **Please submit** your application with a CV, description of research interests, publication list (if relevant), Bachelor’s and Master’s grades (for PhD candidate) and names and e-mails of two possible referees via e-mail to Zala Lenarčič (zala.lenaric@ijs.si) or at <https://academicjobsonline.org/ajo/jobs/24087> (postdoc applications).

Further information about the research activities of:

Zala Lenarčič, <http://www-fl.ijs.si/zala/>,

QuSiED consortium lead by Zala Lenarčič, <https://www.qusied-quantera.ijs.si>,