Leipzig Spin Resonance Colloquium

June 23th, 2021 – 16:00 Leipzig time – on Zoom

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How to avoid HEATED arguments among your spins

Quantum devices could perform some informational tasks with much better performances than classical systems, with profound implications for cryptography, chemistry, material science, and many areas of physics. However, to reach this goal we need to control large quantum systems, where the many-body dynamics becomes fragile and the system quickly heats up to its thermal state.
There are then two key questions:

- How does a closed quantum system thermalize (thus losing its “quantum power”)?
- How can we preserve quantum information in the presence of strong interactions?

Using a nuclear spin chain as an exemplary experimental system, and the tools of Hamiltonian engineering and nuclear magnetic resonance, I will show how to choreograph the dynamics in order to prevent the system from heating up, even in the presence of strong interactions among spins. Among the strategies to prevent thermalization, I will focus on localization via disorder, which can quench the scrambling of quantum information, and Floquet engineering, which can induce prethermalization, a long-lived state that thermalizes only exponentially slowly.

June 23th, 2021 - 16:00 CEST (Berlin) - 22:00 CST (Peking) - 07:00 PST (San Francisco) - 10:00 EST (New York)

Zoom: https://uni-leipzig.zoom.us/my/lsrcolloquium **For Zoom passcode register at:** https://bloch.physgeo.uni-leipzig.de/amr/lsr-colloquium