

Workshop on Frontiers in Quantum Materials



September 1 – 5, 2025

ICTP-SAIFR, São Paulo, Brazil

Venue: Principia Institute

ID: 862 8678 4162

Password: quantum

Home

Invited Speakers

Registration

Program

GROUP 1 (Monday and Thursday)

- **Zorrer, Daniel** (Instituto de Física de São Carlos / USP, Brazil): *Revealing multipolar excitations and strong disorder signatures of spin chains using multidimensional spectroscopy*

In order to characterize quantum many-body systems we introduce the technique of higher-order multidimensional coherent spectroscopy, in which a train of magnetic pulses interacts with the system and couples with its spins. We show that this technique unveils several hidden features in the linear response regime, highlighting multipolar and strong disorder features of spin systems. Besides that, the insertion of disorder in such systems changes their physics dramatically in comparison with the clean counterpart. In this context, we study a non-interacting disordered spin-1 ensemble and show how disorder broads the excitation peaks. Finally, we introduce the strong disorder renormalization group (SDRG) and show the first steps of how to analyze the multidimensional spectrum of disordered chains.