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Quantum Thermodynamics

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Abstract: Thermodynamics sets bounds for different technologies including quantum technologies. In the latter case, out-of-equilibrium dynamics, energy fluctuations and randomness are fundamentally present. On the other hand, modern techniques for manipulation of quantum systems allow experimental access to microscopic states, making explicit the role of information theory in different protocols, which also introduce new perspectives for technological applications. Quantum features such as coherence and non-classical correlations can be employed to obtain advantages or to perform processes that would be impossible in the classical context. In this lecture, we will explore some experiments that harness such quantum advantages such as work extraction and heat transport. We will also discuss some generalizations of the second law in these contexts and possibilities to transcend the classical limits.

Lecturer: Roberto M. Serra is Professor of Quantum Technology at the UFABC in the Sao Paulo metropolitan area, where he runs a quantum information science and technology research group. Before he was post-doctoral researcher at Imperial College London (UK) and a Royal Society 'Newton Advanced Fellow' of the University of York (UK). His research interest is associated with general aspects of Quantum Information and Quantum Thermodynamics encompassing both theoretical and experimental research. More information about him and his research group and activities can be found on the link to his website here below.(text informed by the lecturer).

Presenter: Prof. SERRA, Roberto M. (Federal University of ABC, UFABC, SP, BR)

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