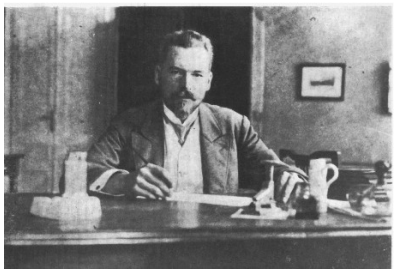

Contribution ID: **20** Type: **Invited talk**

Critical behaviour of interacting thermodynamic machines

Tuesday, 28 September 2021 09:00 (30 minutes)

It is known that in an equilibrium system approaching a critical point, the response to a change in an external thermodynamic force can become significantly large.
In other words, an equilibrium system at the verge of a second-order phase transition is highly susceptible to external thermodynamic forces.

Starting from this premise, in my talk I will discuss the properties of systems of interacting thermodynamic machines that operate at the verge of a phase transition.
I will focus on the performance of different types of out-of-equilibrium machines converting heat or other forms of energy into useful work.
Specifically, I will consider:
i) an out-of-equilibrium lattice model consisting of 2D discrete rotators, in contact with heath reservoirs at different temperatures,
ii) an out-of-equilibrium Frenkel–Kontorova model moving over a periodic substrate and in a position dependent temperature profile,
iii) a transverse field Ising model undergoing a quantum phase transition, and operating as a battery-charger system.
For each of these systems, I will argue that the optimal operating regime occurs when the system is driven out-of-equilibrium in proximity of a phase transition.

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