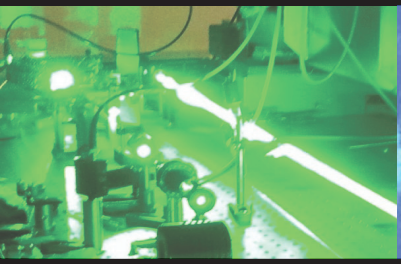
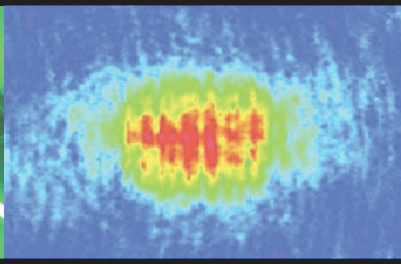
Joint UoC/FORTH AMO Seminar





27 June 2019, 16:30, Physics Department 3rd Floor Seminar Room

Quantum Thermodynamics in Optomechanical Systems

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Conversion of heat into mechanical energy is the central and historical theme of applied thermodynamics. The emerging field of quantum thermodynamics investigates fundamental questions of how to define heat and work for miniature quantum systems and how to extend thermodynamical laws to the operation of quantum machines. Recently, we have proposed optomechanical systems for testing open system thermalization dynamics consistent with the second law of quantum thermodynamics, for producing directional quantum heat propagation as quantum thermal diodes, and for revealing quantum superiority of quantum heat engines exploiting quantum coherence and correlations between a quantum piston and a quantum working fluid. We have argued that optomechanical type interactions can be simulated using spin systems or superconducting artificial atoms, and hence our results have a wider range of applicability. In this talk we will make a brief introduction to quantum thermodynamics, then discuss how to make quantum thermodynamically consistent open system modeling of heat harvesting and conveying systems with optomechanical-type interactions. In addition, we will point out quantum advantages in such systems relative to their classical counterpart.

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