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SADI CARNOT'S LEGACY - "CELEBRATING THE 200TH ANNIVERSARY OF THE 2ND LAW OF THERMODYNAMICS"

When Sadi Carnot published his "Reflections on the motive power of fire" in 1824, there was no sign that one of the greatest scientific revolutions was about to take place, in a world then dominated by mechanics and optics. Yet, by bringing a conceptual analysis to the practical problem of the steam engine, Sadi Carnot wrote the birth certificate of thermodynamics, and, in particular, its second principle.

Today, thermodynamics has branched out into a multitude of fields and applications, from industrial processes to microscopic systems, and continues to renew our view of science. Since its origins, thermodynamics has raised as many questions as it has answered.

To celebrate the bicentenary of the "Réflexions", this colloquium aims to bring together members of the thermodynamics community and to invite them to take a critical look at modern thermodynamics and the open questions it raises. The colloquium will be structured around pedagogical presentations introducing the various fields of the discipline. Poster sessions will allow participants to share their work.

The colloquium, focusing on modern thermodynamics, will take place on the week following [Carnot Lille 2024](#), which follows a more historical focus on Sadi Carnot and his publication.

PROGRAMME & ORATEURS

Presentations are intended to bring together the thermodynamics community at large. They will give a pedagogical introduction and overview of diverse aspects of the field. As a silverline, each talk will start from the second law : how is it expressed and used in this context ?

Presentation will be 40' long. A round table will be held at the end of each session for general discussion and perspectives.

Long breaks for lunch and coffee will allow further exchanges. Posters will be presented during these breaks to support discussions.

Program overview & confirmed speakers

Session : Introduction

- History : "Réflexions sur la puissance motrice du feu", Sadi Carnot, 1824
 - *Raffaele Pisano* (Université des Sciences et Technologies de Lille, IEMN, France)
- Physics : The many faces of entropy
 - *Christophe Goupil* (Université Paris Cité, LIED, France)

Session : Thermodynamics paradigms

- Axiomatic & pragmatic approaches to thermodynamics (provisional title)
 - *Erik Aurell* (KTH, Stockholm, Sweden)
- Out of equilibrium thermodynamics (provisional title)
 - *Pierre Gaspard* (Université Libre de Bruxelles, Belgium)
- Stochastics thermodynamics (provisional title)
 - *Christopher Jarzynski* (University of Maryland, US)

Session : Small scale thermodynamics

- Demons' thermodynamics (provisional title)
 - *Alexia Auffèves (MajuLab, Singapore)*
- Entropy & information (provisional title)
 - *Joan Vaccaro (Griffith university, Australia)*
- Quantum thermodynamics & coherences (provisional title)
 - *Janet Anders (University of Exeter, UK)*

Session : Large scale thermodynamics

- Thermodynamics of complex systems
 - *Rémi Monasson (LPT, ENS, Ecole polytechnique, France)*
- Climate thermodynamics
 - *Dider Paillard (CEA, LSCE, France)*
- Black hole thermodynamics
 - *Éricourgoulhon (Observatoire de Paris, LUTH, France)*
- Thermodynamics & living systems
 - *Pablo Sartori (Instituto Gulbenkian de Ciência, Portugal)*

Session : Applied thermodynamics

- Heat machines thermodynamics
 - *Michel Feidt (Université de Lorraine, LEMTA, France)*
- Chemical engineering thermodynamics
 - *Milivoje M. Kostic (Northern Illinois University, US)*
- Materials thermodynamics
 - *TBA*
- Solar radiation thermodynamics
 - *Tom Markvart (University of Southampton)*

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