

The Warsaw Doctoral School in Natural and Biomedical Sciences and the Institute of Physics PAS cordially invites you to a set of two **SPOTLIGHT TALKS**

## ***Introduction to Casimir energy***

*given by*

**Prof. Bart van Tiggelen**

CNRS Research Professor, Grenoble, France

on 23<sup>rd</sup> May 2023, 10:30 at the IF PAN Auditorium (part 1)

25<sup>th</sup> May 2023, 11:00 at the IF PAN Auditorium (part 2)

Durations: 45 min + question time

***All Warsaw-4-Phd students (and others) very welcome!***

Outline of the two talks:

*Lectures in the classic style - at the board!*

1. A brief history of Casimir energy
2. The Casimir Force (1D, 2D)
  - Finite temperature
  - Proximity force approximation
  - Casimir's theory for the stability of electron
  - Schwinger's theory for sonoluminescence
3. Quantum optics of vacuum fluctuations
  - Quantization of electromagnetic field
  - Fluctuation-dissipation theorem for quantum fluctuations in vacuum and in matter.
  - Van der Waals – Polder force as Casimir energy
  - Lifshitz formula
4. Lorentz invariance of Casimir energy
  - Lorentz invariance of Casimir catastrophe
  - Accelerated observer & Unruh-Hawking effect
  - Casimir energy in Cosmology
5. New developments in Casimir energy
  - Casimir inertial mass
  - Casimir shear friction
  - Casimir mediated phonon transfer
  - Casimir (angular) momentum

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