

17&18
NOV
2025

INTERNATIONAL CONFERENCE

INTENSIVE MAGNITUDES

Org.

Filippo Costantini (CNRS SPHERE, ERC PHILIUMM)

Jeffrey Elawani (McMaster University, SPHERE)

Sponsored by: ERC PHILIUMM – AdG n°101020985;

Séminaire HISTOIRE ET PHILOSOPHIE DES MATHÉMATIQUES – SPHERE.

LUNDI **17**
NOV

Salle 628 (6^e étage) bâtiment Olympe de Gouges
Université Paris Cité 8 Rue Albert Einstein Paris 75013

9.15

INTRODUCTION

9.30-10.30

Richard T.W. Arthur, “Misreading Leibniz’s Space as an Intensive Magnitude: Russell and Deleuze”

10.45-11.45

Oswaldo Ottaviani, “Intensions or degrees of qualities and actions... Leibniz’s account of intensive magnitudes between Mathesis Universalis and Metaphysics”

12.00-13.00

Jeffrey Elawani, “Measuring intensions in the Dynamica”

13.00-14.30

Lunch break

14.30-15.30

Matteo Favaretti Camposampiero, “Wolff on the Quantification of Qualities”

15.45-17.15

Oscar Esquisabel & Federico Raffo Quintana, “Force and Hypothesis. Towards the correct estimation of force in *De corporum concursu*”

CONFERENCE DINNER

PROGRAM

MARDI 18
NOV

Salle 628 (6^e étage) bâtiment Olympe de Gouges
Université Paris Cité 8 Rue Albert Einstein Paris 75013

10.00-11.00

Daniel A. Di Liscia, "*Uniformiter Difformiter Difformis: The latitude of forms, Domingo de Soto's enigmas, and the classification of intensive magnitudes prior to Galileo*"

11.15-12.15

Filippo Costantini, "*How to Divide the Octave. G.W. Leibniz and Conrad Henfling on Musical Temperament*"

12.15-14.00

Lunch break

14.00-15.00

Sylvain Roudaut, "*Defining intensive magnitudes in the 16th century*"

15.15-16.15

Daniel Sutherland, "*Kant on Quantum, Quantitas, and Number*"

PROGRAM

TITLES & ABSTRACTS

Richard T. W. Arthur (McMaster University)

“Misreading Leibniz’s Space as an Intensive Magnitude: Russell and Deleuze”

Abstract:

In his *Das Princip der Infinitesimal-Methode* (1883), the influential neo-Kantian philosopher Hermann Cohen gave an idiosyncratic interpretation of Kant’s principle of the Anticipations of Perception in connection with the foundations of the differential calculus. On his conception, the differential dx is to be understood as an intensive magnitude corresponding to “a fundamental concept of pure thought, the category of reality”, in such a way that the sum of these intensive realities, their definite integral, yields a real, finite quantitative difference x . Although this reading of the calculus was almost universally rejected, Bertrand Russell took it as an accurate portrayal of Leibniz’s understanding of his calculus, and proposed that space for Leibniz is an intensive quantity, so that, having no extended parts, its first elements must therefore be unextended. In this paper I analyze Russell’s misreading. I then turn to an examination of Gilles Deleuze’s notion of space as an “intensive spatium”, a notion whose origin he traces to Leibniz, and argue that it is founded on similar misconceptions.

Daniel A. Di Liscia (Munich Center for Mathematical Philosophy)

Uniformiter Difformiter Difformis: The latitude of forms, Domingo de Soto’s enigmas, and the classification of intensive magnitudes prior to Galileo.

Abstract: TBC

Jeffrey Elawani (McMaster University)

Measuring intensions in the *Dynamica*

Abstract: In this talk, I present the content of my PhD research bearing on the treatment of intensive magnitudes in Leibniz’s longest treatise in natural philosophy, i.e., the *Dynamica*. I suggest that this treatment motivated the bold claims found across the 1690s corpus that intensions, qualities and, even, degrees of reality can be measured in agreement with the general science of quantity. For the sake of explaining the measure of intensions in that treatise, I attend to two essential elements: the generalized operation of product defined by Leibniz [ductus] and the strategy of measuring from the effects [aestimatio in effectibus]. The first element turns out to be a most suited model for the quantification of variable quality over extension. The second element allows us to define an extensive scale translating increase and decrease in an intensive cause. I explain how the two elements are to be fitted within the Leibnizian general science of quantity based on division into dimensionally similar parts. Through the talk, I will discuss the measure of qualitative form like heat and density but also will touch on the possible measure of substantial form in Leibniz.

Oscar M. Esquisabel (Universidad Nacional de la Plata) & Federico Raffo Quintana (Universidad Católica Argentina)

Force and Hypothesis. Towards the correct estimation of force in *De corporum concursu*

Abstract: In this paper, we analyze *schedae* 1 to 2-2 of *De corporum concursu* (1678) as a process aimed at the correct estimation of force (*vis viva*), in which the application of the hypothetical-deductive (or “*a priori* conjectural”) method, governed by the principle of equipollence, plays a central role. After a concise reconstruction of sheets 1 and 2, we focus on sheet 2-2 to show that, from the assumption of the laws of conservation of force (Cartesianly estimated as mv), of the center of gravity, and of relative velocity, results arise that prove either self-contradictory or incompatible with the fundamental principle of mechanics, which states the equipollence between full cause and entire effect and whose truth is grounded in metaphysical reasons. We argue, in this sense, that the revision of the results “after the reform,” based on replacing the “Cartesian hypothesis” with the correct estimation of force (mv^2), resolves these contradictions and establishes the mutual implication among the three aforementioned conservation laws. Consequently, we contend that the hypothetical-deductive method functions as a heuristic tool designed to evaluate the consistency of a set of natural laws, hypothetical in character, with the fundamental principle of mechanics, conceived as a regulatory framework for physical inquiry.

Matteo Favaretti Camposampiero (Ca' Foscari University of Venice)

Wolff on the Quantification of Qualities

Abstract: Christian Wolff's approach to the quantification of qualities can be considered a sort of missing link between the pre-modern debates on the latitude of forms and the late modern interest in intensive magnitudes and psychometry. His treatment of the topic is part of a broader project for "mathematizing" philosophy - i.e., applying mathematical tools (and not only the mathematical method) to virtually every philosophical discipline, including ontology, psychology, and practical philosophy. The first part of my contribution focuses on Wolff's early works and his British sources. The second part considers his later attempts to ground the possibility of a *mathesis universalis* on the assumption that everything finite has a quantity and can therefore be an object of mathematical cognition. Special attention is paid to Wolff's account of degrees as "the quantities of qualities". While this account is certainly indebted to Leibniz's view that changes in substances are to be understood as variations in their limits, Wolff also offers an interesting comparison with some late-scholastic predecessors, emphasizing both his agreement with them and his originality.

Oswaldo Ottaviani (ERC Philiumm)

Intensions or degrees of qualities and actions... Leibniz's account of intensive magnitudes between *Mathesis Universalis* and Metaphysics

In a table of definitions tentatively dated around 1703 (LH IV 7 C, Bl. 94r), Leibniz discusses the notion of 'quantity'. There, Leibniz shows that "degree" is a general concept that receives many specifications according to the different fields to which it can be applied: degree of reality (perfection), degree of matter (density), degree of quantity (proportionality), degree of situation (inclination), degree of form (intensity), degree of action (velocity/promptitude). Following this classification, I will try to provide a provisional account of Leibniz's use of the notion of intensive magnitude, especially focusing on the notion of *intensio*. The latter is sometime used in a metaphysical context, related to Leibniz's notion of perfection(s) or degree(s) of reality, for instance when he refers to God as "a being greatest in the intensity of its perfection, that is a being infinite in power" (GP IV, 511/AG 162). Notice, also that *intensio* is equated to *degrés de réalité* in a well-known passage of the *New Essays* (A VI 6, 486). These metaphysical and theological reflections are also connected to the more technical problem concerning the possibility of how to give an estimate or a measure of intensive magnitudes, including degrees of reality or perfection, in the context of Leibniz's *mathesis universalis* (GM VII, 38; LH 35, 1, 9, Bl.1; Leibniz 2018).

Sylvain Roudaut (CNRS SPHERE - Université Paris Cité)

Defining intensive magnitudes in the 16 th century

Abstract: This article focuses on the ways in which intensive magnitudes were defined in the sixteenth century, with particular attention to how natural philosophers of the period characterized them in contrast to extensive magnitudes. The first part of the study recalls the historical background necessary to understand the main concepts used by sixteenth-century scholars to define intensive magnitudes, concepts largely inherited from the Middle Ages. Particular attention is given to showing that, although there was a tendency to treat intensive magnitudes on the model of extensive ones, natural philosophers of the period clearly distinguished between the level of terminology employed to describe or even calculate intensive phenomena and the ontology underlying that vocabulary. The second part of the study examines the case of natural philosophers of the latter half of the sixteenth century—from Francisco de Toledo to Galileo—who incorporated into their treatment of intensive magnitudes a form of corpuscularism that set their approach apart from that of earlier periods. The final part of the paper offers some remarks on the philosophical consequences of this conception of intensive magnitudes for the formation of "modern" physics.

Filippo Costantini (CNRS-SPHERE)

How to Divide the Octave. G.W. Leibniz and Conrad Henfling on Musical Temperament

Abstract: TBC

Daniel Sutherland (University of Illinois Chicago)

Kant on Quantum, Quantitas, and Number

Abstract: TBC