

# History of Physics

*Monday, 30.06.2014, Room C 230*

Time	ID	<b>HISTORY OF PHYSICS</b> <i>Chair: Jean-François Loude, EPFL</i>
14:00	901	<p style="text-align: center;"><b>Poincaré and the new mechanics, through Lorentz' theory and the reaction principle (1900), The dynamic of the electron (1905) and the Last essays (1912).</b></p> <p style="text-align: center;"><i>Christian Bracco, Université de Nice-Sophia Antipolis, 89 avenue George V, FR-06046 Nice</i></p> <p>If one wishes to understand Poincaré's position towards relativity, it is necessary to grasp the logic of his arguments in the three above-mentioned major works. I will emphasize the introduction of a momentum density for the electromagnetic fields and its consequences ; the use of active Lorentz transformations (boosts) ; his obtention of the relativistic Lagrangian based on general concepts (action, invariance) ; the (secondary) role of electron models ; his relation to the teaching of Mechanics, and finally, his conception of the real meaning of the relativity principle.</p>
14:30	902	<p style="text-align: center;"><b>The 'Boussinesq debate': instability, multiple solutions and free will</b></p> <p style="text-align: center;"><i>Thomas Mueller, Centre Walras-Pareto, Université de Lausanne, Géopolis, 1005 Lausanne</i></p> <p>In 1879 the French mathematician Joseph Boussinesq (re)discovered a property of certain mechanical systems : the equations describing them may have more than one solution. Boussinesq was conscious that multiple solutions arise only in case of instability: nevertheless he considered them as a possible solution to the problem of free will. In the same period several French scholars became interested in cases of instability or sensibility to initial conditions as a possible solution to reconcile free will and the laws of physics. We will present some of the main ideas on this topic, and discuss the epistemological background.</p>
15:00	903	<p style="text-align: center;"><b>The role of hypothetical ontologies in early relativistic quantum theories</b></p> <p style="text-align: center;"><i>Adrien Vila Valls</i>  <i>Laboratoire S2HEP, Université de Lyon, 38 Boulevard Niels Bohr, FR-69622 Villeurbanne</i></p> <p>If abstract and formal considerations have played an increasing role in the creative process of elaboration of quantum theories, the image of physical entities which are supposed to constitute the ontology of quantum physics can have important repercussion both on a heuristic point of view and in the assessment of new theories. This presentation aims to investigate the role of such postulated entities in the work of some early relativistic quantum theoretical physicists. Especially, I will focus on Louis de Broglie's case and I will compare it with the cases of some quantum physicists of this time.</p>
15:30	904	<p style="text-align: center;"><b>The problem of the combination of data in history</b></p> <p style="text-align: center;"><i>Jan Lacki, Université de Genève</i></p> <p>Whenever today, we face several (experimental) determinations of the value of some physical magnitude (assumed constant), we consider without second thoughts, as the way to get to its "exact value", the arithmetic mean of its determinations unless some further evidence is available. Looking at history, it took surprisingly quite a long time to adopt this seemingly obvious procedure to combine multiple experimental data to reach the "exact value". In my talk I want to discuss some of the historical episodes paving the way to our present understanding of the relation between the experimental determinations of the value of some physical magnitude and its "exact value", understood as the one "that makes our equations true".</p>
16:00		<b>Coffee Break</b>

Time	ID	<i>Chair: Jan Lacki, Uni Genève</i>
16:30	905	<p><b>Euler's greatest success: Didactics of 18<sup>th</sup> Century Popular Science Books from a contemporary Perspective</b></p> <p><i>Tibor Gyalog, Fachhochschule Nordwestschweiz, Clarastrasse 57, 4058 Basel</i></p> <p>With over thirty editions in eight different languages, Leonhard Eulers Letters to a German Princess, which appeared in 1768, experienced an unusual success. The Letters constitute a popular science collection of nearly all subjects of physics and philosophy of that time. Also Voltaire's popular science translation of Newton's principia, published twenty years later, had an enormous success. An analysis of these 18<sup>th</sup> Century bestsellers proofs that today's theoretical considerations on didactics fit very well to Euler's and Voltaire's knowledge transfer methods. This is not as astonishing, most of the modern didactical concepts were already published in the first half of the 18<sup>th</sup> Century.</p>
17:00	906	<p><b>Force and work measurement: the beginnings</b></p> <p><i>Jean-François Loude, Fac. SB, IPEP, EPFL, BSP, 1015 Lausanne</i></p> <p>The first practical, portable "dynamometer", designed in 1798 by Regnier, was used to quantify the muscular strength of men and animals. It was promptly used by ethnologists to test the strength of the "savages". A smaller improved model (Collin dynamometer) is still sold to medical and paramedical practitioners. With the development of agricultural and industrial machinery from the beginning of the 19<sup>th</sup> c., the need arose to measure not only the force between a motor and a load, but also the work done and the delivered power. Inventors and mechanics competed to combine heavy force-measuring machinery with newly invented delicate, precise graphic-recording apparatus and/or integrators and planimeters.</p>
17:30	907	<p><b>Historical context of the Swiss atomic weapons program</b></p> <p><i>Jean-Pierre Hurni, Université de Genève, 24 quai Ernest Ansermet, 1211 Genève</i></p> <p>On sait depuis une vingtaine d'années que la Suisse a connu un programme secret d'acquisition d'armes nucléaires de 1946 à 1988. Nous savons tous que ce programme n'a pas abouti à la création d'un arsenal nucléaire suisse, ce qui soulève deux grandes questions: 1) quelles étaient en fait les forces et les faiblesses de la Suisse dans le domaine nucléaire en 1946; et sur quelles traditions scientifique et technique notre pays pouvait compter à cette date ? 2) étant donné les connaissances actuelles, est-ce que ce programme a manqué son but de peu; ou au contraire relevait-il d'une estimation complètement erronée de la situation, aussi bien de la part de nos scientifiques</p>
18:00		<b>END</b>
18:15		<b>Postersession and Apéro</b>
20:15		<b>Public Lecture</b>