AGPhil 1: Epistemological and Conceptual Foundations

Time: Monday 14:00–16:00 Location: BEY 154

AGPhil 1.1 Mon 14:00 BEY 154

Zum Verhältnis zwischen Wissen und Glauben in unserer Zeit - Theorie und Empirie am philosophischen Rand der Physik — •Irena Doicescu — Institut für die Philosophie der Wissenschaft und Religion, 95346 Stadtsteinach

Im Zeitalter des Spezialistentums sehen sich die zwei traditionellen Bereiche unserer Kultur, das religiös fundierte humanistische Denken, beziehungsweise das mathematisch formulierte naturwissenschaftliche Wissen, einem hohen integrativen Druck ausgesetzt. Das Kooperationsgebot ist sowohl kulturhistorisch begründet (in der gemeinsamen Wurzel), als auch auf der praktischen Ebene (die Anwendung neuer naturwissenschaftlichen Methoden führt etwa zu einer tiefen Wandlung mancher ursprünglich rein humanistischer Wissensgebiete).

In dem Vortrag wird ein erkenntnistheoretisches Modell des dynamischen Verhältnisses zwischen Wissen und Glauben vorgestellt. Um die theoretischen Betrachtungen durch eine experimentelle Untersuchung (der tatsächlichen Meinungen) zu ergänzen, wurde ein Fragebogen entwickelt, anhand dessen die diesbezügliche Auffassung der Physikerinnen und Physiker eruiert werden soll. Wie gehen die Vertreterinnen und Vertreter einer Fundamentaldisziplin, welche sich mit kanonischen Fragestellungen bezüglich der Natur der Raumzeit und der Beschaffenheit der Materie beschäftigt, mit ihrem religiösen Erbe um? Diese Aspekte sind spannend und wichtig zugleich, will man treffende Aussagen über die möglichen kulturellen Entwicklungen erreichen, und zwar nicht nur in unserem Kulturkreis, sondern auf globaler Ebene. Die bisherigen Ergebnisse der Umfrage werden vorgestellt und diskutiert.

AGPhil 1.2 Mon 14:30 BEY 154

Newton's and Leibniz's transformation of statics into dynamics - the role of ancient science — •Dieter Suisky — Institut für Physik, Humboldt-Universität zu Berlin, e-mail: dsuisky@physik.hu-berlin.de

An important common feature in the work of Newton and Leibniz is the pronounced opposition to Descartes. Though both scholars started with a direct reference to their predecessor, both changed later their minds and criticized the shortcomings of Descartes' theory. Newton rejected the theory of vortices and the Cartesian innovation in the analytical representation of geometrical relations. Leibniz replaced the Cartesian measure of the quantity of motion or of dead forces with the measure related to living forces. It will be argued that this turn away from the Cartesian theory was performed essentially by means of a reinterpretation of ancient sources. Newton recovered Euclid ("(Newton) had considered the elements of Euclid with that attention, which so excellent a writer deserves." [Pemberton]). Leibniz recovered the achievements of the Peripatetics (Specimen, 1695).

The different outcomes are interpreted in terms of that different reference to ancient legacy. Favouring geometric methods, Newton underestimated the promising power of the analytical approach whereas Leibniz underestimated the heuristic role of the idea of the vacuum.

In the 18th century, this reference to ancient sources had been continued. Euler (Mechanica, 1736) and Du Châtelet (Institutions, 1740) emphasized the decisive role of Archimedes' model of the lever.

AGPhil 1.3 Mon 15:00 BEY 154

The fundamental constants of nature have probably been unchanged during the whole history of the universe — •Karl Otto Greulich — Fritz Lipmann institute Beutenbergstr 11 D 07745 Jena

Physics as we know it is closely related to the actual values of the fundamental constants of nature. Whether the latter have been constant during the whole existence of the universe is still under debate. The fine structure constant alpha can be written as re*me and the gravitation factor gamma = re/mp, where re is the classical electron radius expressed in Planck lengths and me respectively mp the electron and proton mass expressed in Planck masses. Thus, alpha or gamma can have changed with time only, when electron or proton properties or the Planck units have changed, Since alpha is also related to the coupling constant of quantum electrodynamics additional fundamental processes can be traced back to electron or proton properties.

Reference K.O. Greulich Expression of the dimensionless constants of nature as function of proton and electron properties Verhandlungen der DPG 3/2006 Gr 303.1

AGPhil 1.4 Mon 15:30 BEY 154

Are physical theories probable? — •Wolfgang Pietsch — Philosophy of Science, TU München, Germany

It is considered if one can sensibly ascribe probabilities to physical theories. As emphasized in particular by Karl Popper, the issue is intricately linked with the question if the method of physics is inductive or rather hypothetico-deductive. Also, the issue is crucial for determining if scientific reasoning in physics can be spelled out in Bayesian terms. My argument proceeds as follows: First, it is pointed out that physical theories always contain conventions besides empirical hypotheses. Second, it is argued that it constitutes a category mistake to speak of the probability of conventions. Third, it is shown that in abstract theories like physics conventions and empirical hypotheses cannot be clearly separated. These three premises allow to conclude that it constitutes a category mistake to speak of the probability of physical theories.