

AGPhil 6: History and Philosophy of Physics

Zeit: Donnerstag 14:00–16:15

Raum: JUR G

Hauptvortrag

AGPhil 6.1 Do 14:00 JUR G

Kant's dynamic theory of matter in 1755, and its debt to speculative Newtonian experimentalism — ●MICHAELA MASSIMI — Dept. of Science and Technology Studies, University College London, Gower Street, London WC1E 6BT

This paper explores the scientific sources behind Kant's early dynamic theory of matter in 1755, with a focus on two main Kant's writings: *Universal Natural History and Theory of the Heavens* and *On Fire*. The year 1755 has often been portrayed by Kantian scholars as a turning point in the intellectual career of the young Kant, with his much debated conversion to Newton. Via a careful analysis of some salient themes in the two aforementioned works, and a reconstruction of the scientific sources behind them, this paper shows Kant's debt to an often overlooked scientific tradition, i.e. speculative Newtonian experimentalism. The paper argues that more than the *Principia*, it was the speculative experimentalism that goes from Newton's *Opticks* to Herman Boerhaave's *Elementa chemiae* via Stephen Hales' *Vegetable Statics* that played a central role in the elaboration of Kant's early dynamic theory of matter in 1755.

AGPhil 6.2 Do 14:45 JUR G

On the interpretation of Leibniz's unpublished manuscripts on natural sciences — ●HARTMUT HECHT¹ and DIETER SUIISKY² — ¹BBAW, G. W. Leibniz Arbeitsstelle Berlin, hecht@bbaw.de — ²Institut für Physik, Humboldt-Universität zu Berlin

From the very beginning of Leibniz's career, the public and scientific reception of his writings were hampered by the fact that essential parts of his work were either only reluctantly or not at all published. This delay had not only a considerable influence on the interpretation of Leibniz's theory by his contemporaries, but also by his followers. The impact of the discovered and reread manuscripts results in a considerable change of the role Leibniz played in the history of science.

The new edition of manuscripts on physics is not only a contribution to a contemporary interpretation of Leibniz's writings in this discipline, but stimulates also a reinterpretation of his mathematical and philosophical papers. For the first time, the project of a complete edition of Leibniz's papers on natural sciences had been inaugurated. From the results, it can be concluded that the traditionally established interpretation of Leibniz as a representative of one of the great rational systems of the 17th century is to be considerably re-interpreted and modified. Since his stay in Paris in 1672, Leibniz did not only carefully study the results of the empirical sciences, but gave also an interpretation in terms of a specific theory of science. These studies result in a program of physics based on the idea of living forces which was not only alternative to Newton's approach in the *Principia* from 1687, but had been even almost simultaneously published in 1686.

AGPhil 6.3 Do 15:15 JUR G

Euler on the impenetrability of bodies and the liberty of spirits — ●DIETER SUIISKY — Institut für Physik, Humboldt-Universität

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In 1760, Euler commented on the difference between spirits and bodies: "But spirits are of a very different nature, and their actions depend on principles directly opposite. Liberty, entirely excluded from the nature of body, is an essential portion of spirit. A spirit without liberty would no longer be a spirit, as a body without extension or impenetrability would no longer be a body."

It will be demonstrated that Euler modified the conceptual background Leibniz presented in the metaphor of the two labyrinths, that of liberty and necessity and that of continuity and indivisibles involving the notion of infinity. Contrary to Leibniz, who stressed the differences between spirits, Euler accentuated the equality between individuals based on the ability of spirits to make decisions. This is considered as the origin of sin. Bodies cannot deviate in their motions from God's decrees whereas spirits can. This essential issue had been traced back to the controversy between Augustine and Pelagius [Euler, *Lettres*]. Independently of the individuality, Euler assigned the *same responsibility* to every person. Likewise independently of the mass, Euler assigned the *same impenetrability* to every body which is, in case of interaction, considered as the origin of forces. Though in opposition to each other, the notions are mutually connected and the equality of spirits is introduced as a fundamental internal principle. All subsequently assigned differences are to be based upon this fundament.

AGPhil 6.4 Do 15:45 JUR G

Kant on Hume's analysis of causality and Euler's notion of impenetrability — ●DIETER SUIISKY — Institut für Physik, Humboldt-Universität zu Berlin, e-mail: dsuisky@physik.hu-berlin.de

In developing his critical approach, Kant referred in essential issues, the impenetrability of bodies and the causality in nature, to Euler and Hume, respectively. Kant appreciated the contributions of both scholars to the progress in science, but accentuated shortcomings in the foundation of Hume's critique and Euler's mechanics resulting from the underestimation and the overemphasized use of mathematics, respectively. According to Kant, Hume separated mathematics from the critique of causality (schnitt in unbedachtsamer Weise die reine Mathematik davon ab) whereas Euler, making use of a mathematical instead of a physical concept of impenetrability, introduced an occult quality. It will be demonstrated that Kant did not completely analyze how Euler's notion of impenetrability follows from the distinction between *internal* and *external* principles in mechanics. These principles are correlated with the *preservation* and the *change* of the states of bodies, respectively. In contrast to Euler, who rejected all kinds of inherent forces, Kant confined the procedure to the force of inertia and paved the way for the introduction of other forces residing in the bodies. In Euler's mechanics, the forces are not innate or inherent properties of the bodies, but are generated by the interacting bodies whereas in Kant's theory [Metaphysische Anfangsgründe] the attractive and repulsive forces remain to be inherent forces by construction.