AGPhil 1: Philosophie der Physik I

Time: Wednesday 16:30–18:00 Location: H 2033

AGPhil 1.1 Wed 16:30 H 2033

Physics and metaphysics in Newton and Leibniz — •Dieter Suisky — Humboldt-Universität zu Berlin

Leibniz published his treatise on a new physical theory entitled *Theoria motus abstracti* in 1671. It was based on the corpuscular theory which was mainly represented by Democritus, Descartes and Huygens. Simultaneously Leibniz developed a programme for geometry (Analysis situs), which included not only the production of lines by motion (L1), but also forces and effects (L2). Between 1675 and 1676, Leibniz introduced the notions of dead and living forces by non-metaphysical considerations and analyzed relative motion. After 1678 Leibniz performed a substantial turn towards a metaphysical foundation of physics.
Newton, after having abandoned alchemistic and theological studies, was challenged by the investigation and description of planetary motion. Geometrically, the solution was constructed in terms of "curvilinear figures which are considered as generated by growing" (similar to L1). In physics, Newton replaced at first the Aristotelian theory with the idea of conatus and introduced additionally the postulate: "Force is the causal principle of rest and motion." (1685) After that step and having further distinguished between rest, uniform and non-uniform motion, Newton succeeded in constructing dynamics by means of inertia and impressed moving forces (1687). Alternatively, Leibniz maintained his previous non-metaphysical keystone of living forces (L2)(1686) which had been later called kinetic energy by his followers.

AGPhil 1.2 Wed 17:00 H 2033

The reception of the Cartesian legacy by Euler and Du Châtelet — •Dieter Suisky — Humboldt-Universität zu Berlin

The cornerstone of Descartes' theory is the strict distinction between thinking and extension which is represented by the difference between spirits and bodies. Locke and his disciple Voltaire claimed that an idea of a thinking matter is possible. Although being in other questions in disagreement, Émilie Du Châtelet (1706-1749) and Leonhard Euler (1707-1783) were in perfect accord in defending Descartes' basic notions and argued against Locke, Voltaire and La Mettrie.

In her treatise *Foundations of physics* Du Châtelet argued: Some philosophers say, that "God may have given to matter the attribute of thought, though it does not have it by its essence, and thus, as we do not know what it pleased God to do, we can not know either that what thinks in us is matter or not. ... I say that it is impossible, even by the will of God that is used here, because one have seen that the possibility of things does not depend on that will."

Two decades later in his *Letters to a German princess*, Euler confirmed this argumentation: "But spirits are of a very different nature, and their actions depend on principles directly opposite. ... This property is as essential to spirits as extension or impenetrability is to body; and as it would be impossible for the divine Omnipotence itself to divest body of these qualities, it would be equally impossible for it to divest spirits of liberty."

Du Châtelet and Euler argue in conformity to Descartes and Leibniz and are in pronounced opposition to Locke and Voltaire.

AGPhil 1.3 Wed 17:30 H 2033

Divergente Kehrseite einer konvergenten Folge — •Friedrich Siems — Jahnweg 1A, 78476 Allensbach

Vor etwa 2500 Jahren erfand Xenon von Elea das Prinzip der konvergenten Folge, indem er das Paradoxon aufstellte, daß eine Schildkröte von Achilles nicht eingeholt werden kann, wenn diese den Wettlauf mit einem Vorsprung beginnt. Denn während Achilles den Vorsprung einholt, erzeugt die Schildkröte einen neuen Vorsprung, den Achilles wieder aufholen muß, und so fort.

Diese Vorsprünge bilden eine konvergente Folge mit dem Grenzwert Null, wobei die Anzahl der Glieder dieser Folge divergent ist. Wegen dieser Divergenz kann eine solche Folge im Experiment nicht vollständig aufgelöst werden.

In meinem Vortrag wird dies näher untersucht und in Beziehung zu den infinitesimalen Methoden der Physik gesetzt.