

## AGPhil 5: Laws of Nature

Time: Wednesday 14:00–16:00

Location: H-HS III

**Invited Talk** AGPhil 5.1 Wed 14:00 H-HS III  
**Laws of nature and their modal surface structure** — ●ANDREAS HÜTTEMANN — Universität zu Köln

I will start by arguing that the practices of explanation, confirmation, manipulation and prediction require a particular reading of the law statements involved, namely as making claims about systems. These claims, I will argue further, are modal statements, statements about how systems may or may not behave. More particularly I will defend three claims about the modality of laws. First, law statements attribute a space of possible states to systems. Second, laws constrain the temporal development of systems by virtue of what I will call law equations. Thirdly, the laws\* inviolability or natural necessity can be explicated in terms of the fact that they are invariant with respect to a number of different kinds of circum-stances.

AGPhil 5.2 Wed 14:45 H-HS III  
**The modal status of the laws of nature. Tahko’s hybrid view and the kinematical/dynamical distinction.** — ●SALIM HIRÈCHE<sup>1</sup>, NIELS LINNEMANN<sup>4</sup>, ROBERT MICHELS<sup>1,2,3</sup>, and LISA VOGT<sup>1,5</sup> — <sup>1</sup>Université de Genève — <sup>2</sup>Université de Neuchâtel — <sup>3</sup>Università della Svizzera italiana — <sup>4</sup>Universität Bremen — <sup>5</sup>Universitat de Barcelona

Tahko (2015) recently argued for a hybrid view of the laws of nature, according to which some physical laws are metaphysically necessary, while others are metaphysically contingent. His core idea is that the metaphysically necessary laws feature fundamental natural kinds, while the contingent laws do not. We show that this criterion is on its own insufficient: First, it lacks robustness, since it fails to rule out redescriptions of Tahko’s crucial case study of a metaphysically contin-

gent law (Coulomb’s law) according to which the law features a natural kind and therefore qualifies, pace Tahko, as metaphysically necessary. Second, the focus on kinds is unwarranted, given that natural kinds could be in principle substituted by different entities whose essences ground the metaphysical necessity of the law. Third, the criterion does not have a clear motivation from the perspective of naturalized metaphysics. We then propose an alternative way of drawing the metaphysically necessary/contingent-distinction for laws of physics based on the central kinematical/dynamical-distinction used in physical theorising. As we argue, this new criterion can be used to amend Tahko’s own account, but can also be combined with different metaphysical views about the source of necessity.

**Invited Talk** AGPhil 5.3 Wed 15:15 H-HS III  
**When do we stop digging? Conditions on a fundamental theory of physics** — ●KAREN CROWTHER — University of Oslo

In seeking an answer to the question of what it means for a theory to be fundamental, it is enlightening to ask why the current best theories of physics are not generally believed to be fundamental. This reveals a set of conditions that a theory of physics must satisfy in order to be considered fundamental. Physics aspires to describe ever deeper levels of reality, which may be without end. Ultimately, at any stage we may not be able to tell whether we’ve reached rock bottom, or even if there is a base level—nevertheless, I draft a checklist to help us identify when to stop digging, in the case where we may have reached a candidate for a final theory. Given that the list is—according to (current) mainstream belief in high-energy physics—complete, and each criterion well-motivated, I argue that a physical theory that satisfies all the criteria can be assumed to be fundamental in the absence of evidence to the contrary.