

AGPhil 11: Extending General Relativity

Time: Friday 14:00–15:15

Location: A 060

Invited Talk

AGPhil 11.1 Fri 14:00 A 060

A virtuous theorist's theoretical virtues: Einstein on physics vs. math and experience vs. unification — ●JEROEN VAN DON-
GEN — University of Amsterdam/Utrecht University

When Albert Einstein formulated the general theory of relativity, he combined a physical and mathematical approach, as Renn c.s. have shown. He retained and explicitly referred to these categories also in his later work in unified field theory, but emphasized their usefulness differently, just as his later recollections of how he found general relativity gradually changed. These altered recollections were not only the consequence of his new, highly mathematical unification program, but also served as an advertisement for that program: Einstein enlisted idealizations of his self as justification for his highly controversial work.

AGPhil 11.2 Fri 14:45 A 060

The Schism - The Origins of Canonical and Covariant Quantum Gravity — ●ALEXANDER BLUM — Max-Planck-Institut für Wis-

senschaftsgeschichte

The split between covariant and canonical approaches to quantum gravity is today well established and manifests itself in the contemporary divide between the two main approaches, string theory and loop quantum gravity. I trace the origin of this divide to two attempts in the 1930s to go beyond the equal-time commutators, which were the standard quantization technique in the quantum electrodynamics of the day: On the one hand, the covariant commutation relations of Paul Dirac's interaction representation, developed in 1932. On the other hand, the generalized commutation relations on space-like surfaces, developed by Paul Weiss in the years 1936-1938. I will further outline, how the former were adopted by the quantum community, because the split between kinematics and dynamics that they implied became conceptually important in renormalization theory, while the latter were adopted by the general relativity community, precisely because they allowed to avoid this split.