

Seminario di Epistemologia storica

Mercoledì 26 febbraio 2020, h. 14.30
Sala Seminari (Dip. Filosofia, III piano)



*Voir venir les choses est
le meilleur moyen de les expliquer*
P.J.F. Turpin

Roberto Lalli (Max Planck Institute for the History of Science)

*The dynamics of collaboration networks and the history of general relativity,
1925-1970*

This talk presents the results of our analysis of the development of general relativity between 1925 and 1970 based on the conceptual and methodological framework of socio-epistemic networks comprised of three different layers: social, semiotic and semantic. Our computational approach is used to uncover the mechanism of the passage between the low-water-mark of general relativity—roughly from the mid-1920s to the mid-1950s—and the so-called renaissance of the theory after the mid-1950s. Based on this multi-layer analysis, we provide substantial empirical evidence that between the second half of the 1950s and the early 1960s there was an evident shift in all three layers.

Our analysis disproves common explanations of the renaissance process. It shows that this phenomenon was not a consequence of astrophysical discoveries in the 1960s, nor was it a simple by-product of socio-economic transformations in the physics landscape after World War II. We argue instead that the renaissance has to be understood as a two-phase process both at the social and at the epistemic level. The first occurred between the second half of the 1950s and the early 1960s, when a growing community of physicists redirected their interest toward physical problems in general relativity, while the previous period was characterized by a dispersion of research agendas aimed substituting Einstein's gravitational theory with a different and more general one. We call this first phase the theoretical renaissance general relativity. The second phase, which we call the astrophysical turn, was instead an experiment-driven process that started with the discovery of quasars and was characterized by the emergence of relativistic astrophysics and physical cosmology as well as the early phases of gravitational-wave astronomy.