METHODS OF CAUSAL INFERENCE AND

SCIENTIFIC REPRESENTATION (MCISR) SEMINAR

SEMINARIO SOBRE MÉTODOS DE INFERENCIA CAUSAL Y

REPRESENTACIÓN CIENTÍFICA (MICRC)

FRIDAY 16 DECEMBER 2016 VIERNES 16 DE DICIEMBRE DE 2016

Conference Room A-217
Faculty of Philosophy, Complutense University
/
Sala de Actos A-217
Factultad de Filosofía, Universidad Complutense de Madrid

15:30 – 17:30 Erik Curiel (Munich Centre for Mathematical Philosophy): "**Animadversions on the Semantic View**"

18:00 – 20:00 Pablo Ruiz de Olano (University of Notre Dame): "**Epistemic Values in Theoretical Particle Physics: The Case of the Strong Nuclear Interaction**"

For further info / información: msuarez@filos.ucm.es

Directions / Dirección:

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ABSTRACT: **Animadversions on the Semantic View**

Erik Curiel (Munich Centre for Mathematical Philosophy)

The semantic view of theories, the dominant view in the literature for the past few decades, holds roughly that a theory is (or is fully characterized by) its set of models, in the Tarskian sense. I offer four arguments why such an account cannot provide a sufficiently rich foundation for a full semantics of physical theories. First, on such a view, theories tell us what the world would be like if the theory were true of it, nothing more and nothing less. But that cannot be correct, as theories are often used with great success to characterize and shed light on physical systems they do not provide sound or accurate models of. Second, in Tarskian semantics no semantic content can reside in or accrue to relations among a theory's models. But relations among the individual models of a physical theory in fact express much that the theory tells us about the world. Third, the semantic view cannot distinguish between the significance of true predictions of a theory and propositions the theory requires as preconditions for its application in practice. Fourth, and finally, a Tarskian semantics cannot distinguish mathematical operations among physical quantities that have real physical significance from those that don't.

ABSTRACT: **Epistemic Values in Theoretical Particle Physics: The Case of the Strong Nuclear Interaction**

Pablo Ruiz de Olano (University of Notre Dame)

During the 1950s and 1960s, particle physicists took decisive steps towards developing what is now known as the Standard Model of Particle Physicsts. As it is commonly agreed, symmetries and conservation laws played a crucial role in this achievement. In spite of this, however, there is still a relative scarcity of works explaning how exactly symmetries and conservation laws were used during these two decades, and why they were so useful in producing successful theories of elementary particle physics. In this paper, I attempt to accomplish two different things. First, I provide a case-study documenting the various ways in which symmetries and conservation laws were as a matter of historical fact used during the 50s and 60s, in order to develop a theory for the strong nuclear interaction. The case-study covers the years between 1955 and 1964, and focuses on two different approaches championed by Murray Gell-Mann and Julian Schwinger on the one hand, and Tsung Dao Lee and Chen Ning Yang on the other hand. Secondly, I make a philosophical claim about the manner in which the particle physics community evaluated these two research programs. My claim is, in particular, that decisions about the relative merits of the two approaches were made by appealing to a small number of epistemic values, which include the epistemic values of empirical adequacy, fruitfulness, and consistency with other accepted theories. I conclude with some remarks about what this second claim entails for the question of why is it that symmetries and conservation laws proved so useful in guiding research during the early history of particle physics.