



EINLADUNG ZUM KOLLOQUIUM

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Exploration: A study of the Philosophy of Experimentation in the Context of the High Energy Particle Physics

According to the common conception, exploratory experimentation is performed in cases where no well-formed theoretical framework of the phenomena of interest (yet) exists. In this study, I shall argue that this is a narrow conception and that exploratory experimentation can also be performed in cases where there exists a well-formed theoretical framework of the phenomena of interest to guide experimental procedures. To this end, I shall suggest that exploration can be achieved through a variety of, what I shall call, exploratory methods. I shall characterize an exploratory method as a type of experimental method that serves to open up a broad range of possibilities for performing experimental procedures and thus for achieving the intended objectives of experimentation, thereby allowing for the possibility of a variety of experimental outcomes, including the ones that are not foreseen within the adopted theoretical framework of the phenomena of interest. I shall illustrate the present account in the context of the ATLAS experiment that has been running at CERN's Large Hadron Collider, where the long-sought Higgs particle has been recently discovered. I shall argue that in the case of the ATLAS experiment, what I shall call, the method of robust-prediction testing is used as an exploratory method to achieve the intended objectives of the experiment. Contrary to the common conception, I shall conclude that testing is among the goals of exploratory experimentation.

Koray Karaca studied physics at the Middle East Technical University in Ankara, Turkey, and graduated with a Ph.D. in theoretical cosmology from the same university in 2005. Thereafter, he studied history and philosophy of science at Indiana University, USA, gaining his second Ph.D. in 2010. Since then, he is a postdoctoral researcher in the Interdisciplinary Center for Science and Technology Studies (IZWT) at Bergische Universität Wuppertal and involved in the project entitled "Epistemology of the Large Hadron Collider". Dr. Karaca has research interests in the areas of history and philosophy of modern physics, philosophy of scientific experimentation, and philosophy of simulation and modeling.

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