

## **1st International Seminar on History and Philosophy of Verity**

### Truth and Reality in Science

**Date:** July 30th, 2019

**Location:** Lecture Room 41, Human Sciences Building 4F, Osaka University

#### **15:00~16:00 Man-Ho Chan (The Education University of Hong Kong)**

**Title:** Is the standard model of cosmology built upon conventionalist stratagems?

**Abstract:** Recently, some studies point out that our current standard model of cosmology is built upon a set of conventionalist stratagems. Some believe that the theories of dark matter and dark energy are ad hoc hypotheses to account for the observational anomalies. As Karl Popper argues, it is crucial to avoid conventionalist stratagems if falsifiability of a theory has to be preserved. In this presentation, from the perspective of history and philosophy of science, I will show that the current model of cosmology, the Lambda-Cold-Dark-Matter model, is not built upon any conventionalist stratagem. The concepts of dark matter and dark energy have good theoretical ground in physics so that they should not be regarded as ad hoc hypotheses.

#### **16:10~17:10 Shou Fujita (Osaka University)**

**Title:** Emergence in Physics and Quantized Spacetime

**Abstract:** In recent philosophical discussions about contemporary physics, namely quantum gravity theory, spacetime is said to be emergent or derived, rather than fundamental (Huggett and Wuthrich). This makes it very difficult to understand traditional scientific realism and ontology since we admit matters or local beables, which we can take to be real, in our universe on the presupposition that we can observe them empirically in somewhere of spacetime. In addition, this problem forces us to reconsider about realism of spacetime itself, even if emergent spacetime is robust to some extent against more fundamental quantum gravity theories as Butterfield showed (Butterfield 2011). Are theories without spacetime approaching the truth in our universe? As to this question, I will focus on the difference of structures between macro and micro regions and consider why the idea of “emergence of spacetime” is needed when spacetime or gravity is quantized.

#### **18:00~20:00 Dinner-Time Discussion**