

## Raúl Carballo-Rubio: "Emergence of gauge symmetries: a working example"

*Friday, 22 June 2018 10:00 (45 minutes)*

In this talk I will present an emergent theory of electromagnetism as a working example of how gauge symmetries can emerge from systems with a priori no such symmetries. The theory is inspired by the physics of the superfluid phases of Helium 3. I will discuss the main ingredients of this concrete emergence mechanism and show how one can describe it from two slightly different perspectives.

Finally, I shall pass to discuss whether a similar mechanism could be behind the emergence of diffeomorphism invariance. This discussion is in direct correspondence with the possibility of constructing a theory of quantum gravity along the same ideas. I will mention some of the challenges still remaining to lead this program to completion.

**Session Classification:** Morning session