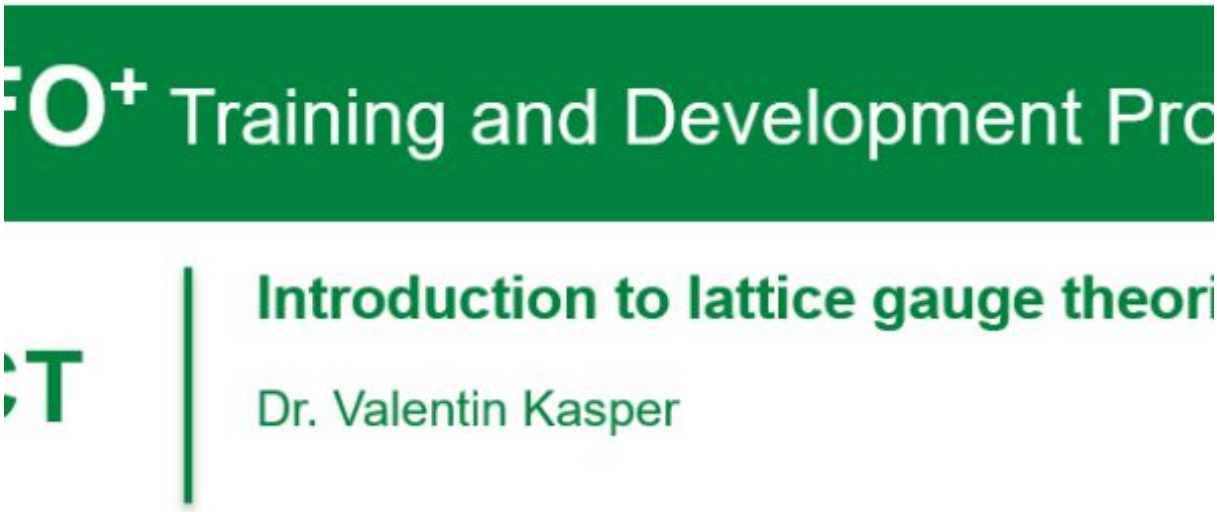



# THEORY LECTURE: Introduction to lattice gauge theories (III)

VALENTIN KASPER

October 20, 2020
10:00 to 12:00
Online (Teams)

Gauge theories are of fundamental importance to understand completely different states of matter ranging from particle physics to strongly correlated materials. However, lattice gauge theories are not only important to understand quantum matter, but recently became also particular relevant for quantum information processing. We begin this lecture series with a thorough discussion of the theoretical framework necessary for lattice gauge theories. In particular we will discuss discrete and continuous symmetries, as well as Abelian and non-Abelian symmetries. In condensed matter physics, gauge theories appear as effective descriptions of interacting many-body systems, whereas in particle physics gauge invariance is usually postulated as a fundamental principle of nature. In these theory lectures we will discuss both viewpoints and will illustrate the phenomenology of specific lattice gauge theories. Finally, we will discuss the exciting prospect of quantum simulation with current

experiments.

**Due to recommendations in place to help contain the spread of COVID-19, the Theory Lectures will be carried out remotely via MS Teams. If you would like to receive an invitatio to attend the online session, you can send an email to**[Alba.Berenguer@icfo.eu](mailto:Alba.Berenguer@icfo.eu)

**Hosted by:** Maciej Lewenstein