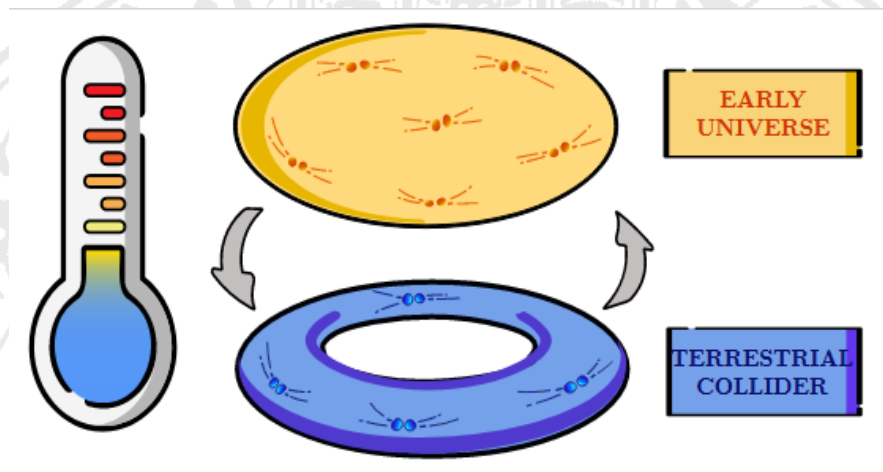


SONDERKOLLOQUIUM

AM 10. JULI 2024 UM 08:00 UHR

BIBLIOTHEK, WESTBAU PHYSIK



The Early Universe: a Thermal Collider for Physics Beyond the Standard Model

DR. SIMONE BIONDINI
UNIVERSITÄT BASEL

Understanding dark matter and the imbalance between matter and antimatter in the universe presents a fascinating link between particle physics and cosmology. We can think of the early universe as a "thermal collider", where numerous reactions occur under extremely hot and dense conditions. To this end, quantum field theoretical tools at finite temperatures are necessary to obtain solid theoretical predictions and allow for comparisons with experimental measurements.

In this talk, we will explore how dark matter could have formed through freeze-out and freeze-in mechanisms. We will discuss how bound-state effects, thermal masses, and multiple soft scatterings influence the extraction of the dark matter energy density, together with their impact on experimental searches. We will also explore the connection between dark sectors and a strong electroweak phase transition, highlighting their interplay in the early universe and their phenomenological prospects.