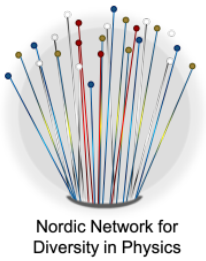

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Collider physics and the Early Universe

Friday 19 August 2022 12:00 (30 minutes)

The Standard Model of particle physics is an extremely successful theory predicting experimental outcomes with outstanding accuracy. Its last particle, the Higgs boson, was experimentally observed 10 years ago by ATLAS and CMS experiments at the LHC and has been studied with increased accuracy since then. Yet, all the particles of the Standard Model make only 5% of matter-energy budget of the observable Universe. The Standard Model does not give an explanation why even this 5% exists. Moreover, the Higgs boson seems to have "set"the vacuum of our Universe in an energetically metastable state. The low value of now precisely measured Higgs boson mass, also remains a mystery from a theory point of view.
Proton-proton collisions at the Large Hadron Collider recreate conditions from a less of a picosecond after the Big Bang. The Run 3 of the LHC has just started and will bring unprecedented amount of data. Can we understand the Early Universe from the measurements at the LHC and elucidate some of the mysteries of the Universe today?

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