

S E M I N A R



Prof Farid Ould-Saada
(University of Oslo)

Prof Ould-Saada is a prominent physicist at the University of Oslo, specialising in high-energy particle physics and research with the ATLAS experiment at the Large Hadron Collider (LHC).

Date:

Thursday, 5 February 2026

Time:

11h00-12h00 SAST

Venues:

- **NITheCS Seminar Room**
University of KwaZulu-Natal
Westville Campus
3rd Floor, H-Block,
School of Chemistry and Physics
- **Online**

WHO SHOULD ATTEND?

The seminar should be accessible to advanced undergraduates and will highlight results that should interest advanced researchers.

ENQUIRIES:

Email Dr Pedro Mafa: MafaT@ukzn.ac.za

Telescoping Physics of the Early Universe - the role of the Large Hadron Collider

ABSTRACT

Advanced technological instruments such as microscopes, telescopes, and high-energy accelerators have driven major breakthroughs in their respective fields and often complement each other across the sciences. They allow us to observe and study different aspects of the universe, although operating on vastly different scales and principles.

The Large Hadron Collider, the world's largest and most powerful particle accelerator, collides high-energy protons and heavy-ions to recreate conditions that prevailed just after the big-bang. The LHC, together with sophisticated cameras, such as the ATLAS experiment, and a worldwide distributed computing infrastructure, acts as a 'time-travel microscope', telescoping physics of the early Universe.

Is there any new physics beyond the current theoretical framework: dark matter, new symmetries of Nature, new space dimension? Maybe something we have not yet thought of? Will an inner structure of the currently elementary particles be revealed at the attoscale distances? Nature's fundamental constants, which are key quantities defining the behaviour of physics' laws, are measured at various scales. Extremely precise measurements allow control of matter at the nanoscale, This may open the door to future technologies that could work at even smaller scales, possibly enabling next-generation technologies.

The advent of the High Luminosity LHC from 2030 will open up for interesting measurements that will take advantage of higher collision rates, upgraded detectors and recent developments in AI and ML. This also constitutes a challenge for the computing infrastructure.

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