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UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

S E M I N A R

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Is there a relationship between the Gravitational Arrow of Time and Singularity Censorship during Collapse?

ABSTRACT

The causality of our universe is protected because the singularities formed during collapse are hidden behind horizons, a phenomenon described by the cosmic censorship conjecture. To investigate this, we consider a collapsing radiating star that satisfies the energy conditions throughout the process, ensuring the validity of conventional physics. Employing the geometric properties of the null geodesics, we show that the balance between the Ricci scalar (curvature due to matter) and the Weyl scalar (due to free gravitational field) plays a crucial role in the causal evolution of the horizon, thereby affecting the local visibility of the singularity. From this, the necessary and sufficient condition for a locally naked singularity can also be obtained. Interestingly, these same curvature scalars can be employed to understand the notion of the gravitational arrow of time. We will discuss the role of free gravity during the process, and explore the possible connection between singularity censorship and the time arrow during collapse.

Dr Samarjit Chakraborty is a postdoctoral fellow at the School of Mathematics, Statistics and Computer Science – at the University of KwaZulu-Natal.

Date:
Thursday, 11 June 2026

Time:
12h15-13h15 SAST

Venues:

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

WHO SHOULD ATTEND?
All are welcome.

ENQUIRIES:
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