

SEMINAR

Modelling Early-Time Baryon Dynamics in the Fragmentation Region

ABSTRACT

The forthcoming expansion of experimental reach into far forward kinematics offers a unique terrestrial laboratory to probe baryon-rich QCD matter. As forward detector upgrades at RHIC and the LHC prepare to take data, interpreting the dynamics of the fragmentation regions requires theoretical baselines that extend beyond traditional boost-invariant paradigms.

This talk explores a newly developed 3+1D classical transport framework designed to model pre-equilibrium baryon number deposition. Working in the target rest frame, the collision is modelled as an ultra-relativistic Colour Glass Condensate sheet traversing a static distribution of collisionless Wong quarks. We extract the saturation-driven momentum kicks imparted to the target quarks from the McLerran Venugopalan model and establish a kinetic transport framework that is robust enough to accommodate an arbitrary initial distribution, including a Woods-Saxon profile.

The presentation will focus on preliminary results that demonstrate the competition between longitudinal compression and transverse expansion induced by momentum broadening. These findings lay the mathematical groundwork for a macroscopic baseline for forward-rapidity hydrodynamics.

Dr Mawande Lushozi is a Lecturer in the Department of Physics at the University of Cape Town (UCT), specialising in theoretical high-energy physics. His research explores Quantum Chromodynamics and early-time dynamics in ultrarelativistic heavy-ion collisions, with a particular focus on gluon saturation physics in the fragmentation region.

An alumnus of the University of the Witwatersrand, he completed his PhD at the UCT in 2017 before undertaking postdoctoral fellowships at UCT and the Institute for Nuclear Theory in Seattle, USA.



Dr Mawande Lushozi
(University of Cape Town)

DATE:

Tuesday, 15 September 2026

TIME:

13h15-14h15 SAST

VENUES:

- Honours Presentation Room P213
2nd floor, School of Physics
East Campus
University of the Witwatersrand
- Online

WHO SHOULD ATTEND?

All are welcome.

ENQUIRIES:

Email Antonette Gouws:
Antonette.Gouws@wits.ac.za

REGISTER: <https://bit.ly/3TlflQm>

