

Presented by:

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National Institute for
Theoretical and Computational Sciences

‘Developments towards a Quantum Internet’

Dr Yaseera Ismail (University of KwaZulu-Natal)

Friday, 14 April 2023 | 16h00 – 17h00 SAST

Attend in person* or online

* (Neelsie Cinema, Stellenbosch University)

--- Cheese and wine will be served at the venue ---

ABSTRACT

Quantum information science offers an alternative method of ensuring the security of information through the application of quantum communication. Quantum communication, or more specifically, Quantum Key Distribution (QKD), is based on a physical process of ensuring information security through transmitting quantum carriers in the form of single photons. Single photons are transmitted via a quantum channel that can be either free space or an optical fibre. A secure key is created from the key distribution process. This shifts the paradigm away from a mathematical approach towards a physical approach to ensuring information security. Quantum communications leverage the properties of quantum state preparation and measurement and intrinsic quantum phenomena such as entanglement to create secure communications networks and enable a range of longer-term applications, including distributed sensing and remote or distributed quantum computing. A primary motivation for developing quantum communication systems is to create secure communication networks to protect against data security threats. Here we explore developments in the field that could lead to a quantum internet.

BIOGRAPHY

Dr Ismail is a Senior Lecturer at the University of KwaZulu-Natal (UKZN) received a Master of Science in Physics *cum laude* in 2011, based at the Cou Scientific and Industrial Research (CSIR). In 2015, she obtained her PhD with Quantum Research Group at UKZN. Her research is based on the advanced quantum technology, specialising in improving optical techniques for quantum communication.

She received the 2016 TechWomen Emerging Leader Award and served as an Ambassador of Optica (formerly called Optical Society of America (OSA)) in 2021. She serves on the editorial board of the *Scientific Reports Journal* and was a DHET Future Professor Fellow in 2021. Dr Ismail is also Optica's Vice President on the International Commission for Optics.



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