**Exploring the development of Quantum Technology towards a Quantum Internet**

*Stellenbosch University, South Africa*

**Yaseera Ismail**

**Email: yaseraismail@sun.ac.za**

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 creating secure communication networks to protect against data security threats. Here we explore the developments in the field that could lead to a quantum internet.

**Short Bio:**

A person with long hair wearing a black jacket

Description automatically generated**Yaseera Ismail received his PhD degree in Physics from the University of KwaZulu-Natal, South Africa. She is a senior lecturer and heads the QuPhotonic Lab at Stellenbosch University, South Africa. Her research interest lies in developing quantum-enabled devices in the field of quantum communication. She is a recipient of three Technology Innovation Agency (TIA) Seed Fund Grants and has a successful BRICS Joint Multi-lateral Science and Technology Research GRANT focusing on the implementation of South Africa first Quantum Satellite Link. She received the 2016 TechWomen Emerging Leader Award and is Optica’s appointed Vice President on the International Commission for Optics. Dr Ismail was recently inaugurated into the South African Young Academy of Science.**