PHYSICS SEMINAR

Keeping Secrets with Physics: Quantum Cryptography

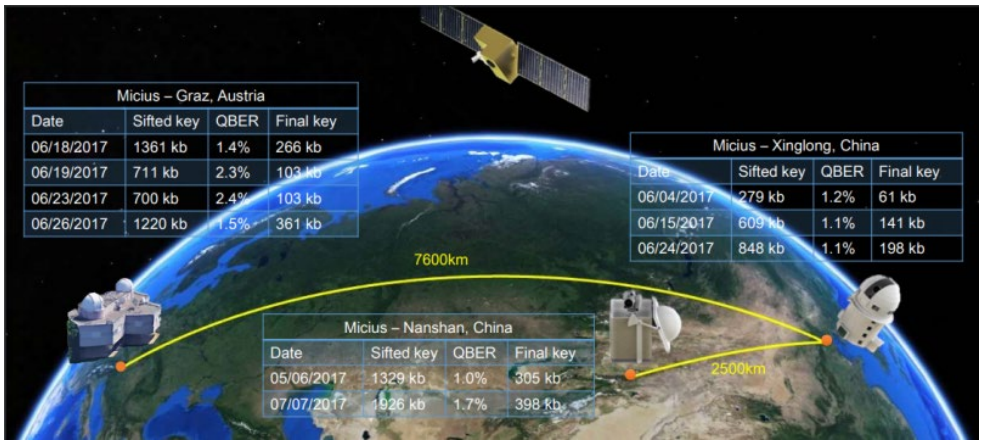
David Collins

Thursday, January 29, 2026
12:30 – 1:30 p.m.
WS 160

Cryptography involves the transmission and sharing of messages using a shared secret cryptographic key. In the classical world an eavesdropper could intercept the secret key and use it to decode the secret messages without being detected.

In the 1980s several protocols for key sharing based on the transmission of quantum mechanical particles appeared. These utilize fundamental aspects of quantum mechanics to generate and share keys which cannot be intercepted without the protagonists' knowledge. Experimental implementations of variants of quantum cryptographic key distribution schemes have reached the point where quantum key distribution can be done via satellite between continents.

This talk reviews some cryptographic schemes, the quantum mechanics needed for these and presents the basic ingredients of the most notable QKD scheme. This presentation illustrates one facet of the field of quantum information, which also includes quantum computing, quantum estimation and quantum information theory and which will be covered in a topics course in the Fall 2026 semester.



Refreshments!