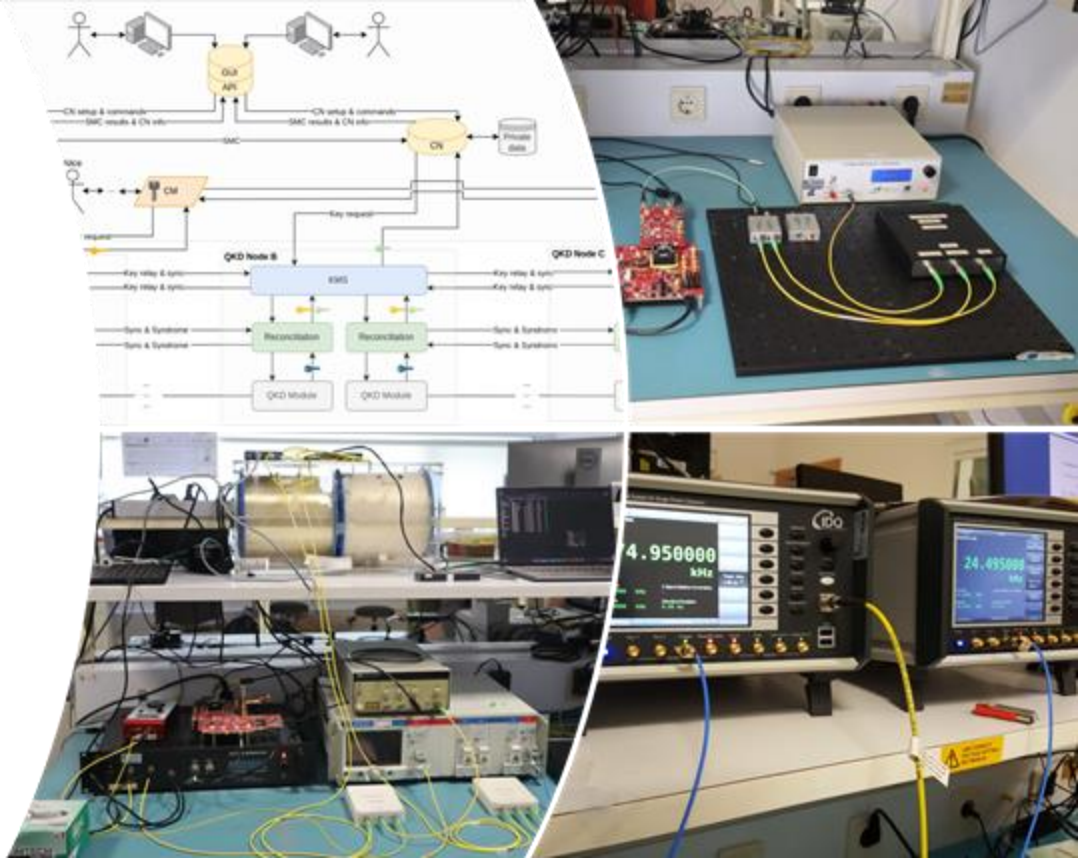
quantum communications

Quantum Key Reconciliation Application



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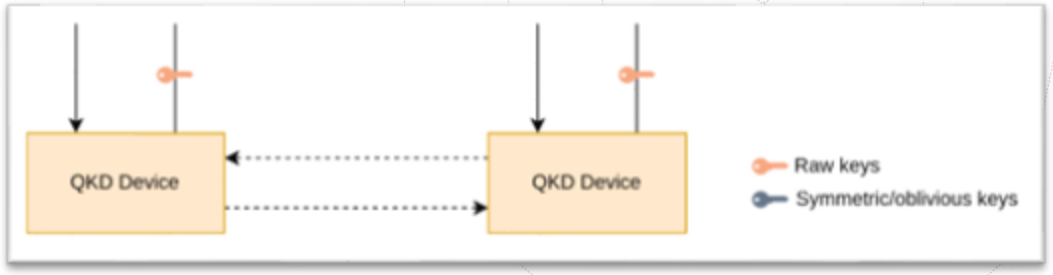
Group Meeting
24 April

Motivation / The Problem Being Addressed

- Physical quantum key generation is not perfectly synchronized

- Raw keys must be corrected, securely transformed into either symmetric or oblivious keys.

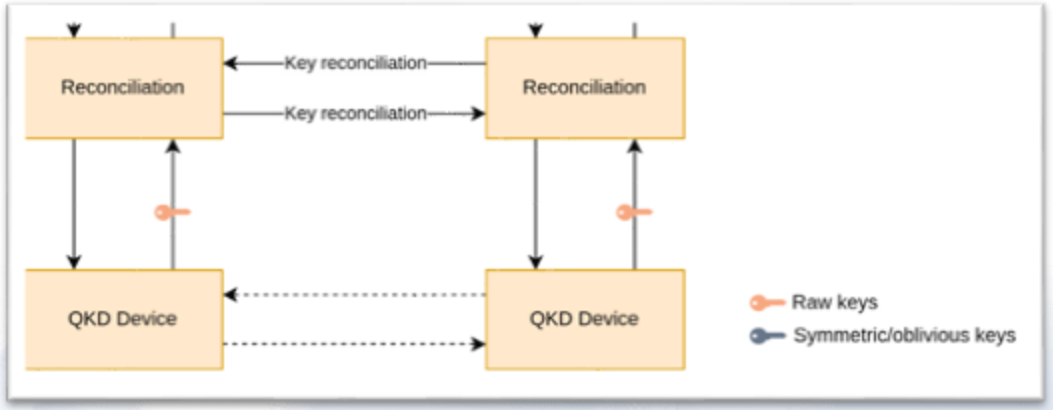


The Proposed Solution / Challenges

- Reconciliation using LDPC algorithm

- C++ implementation using the NetXpto framework to handle signal processing

- Raw key emulation and physical layer comms



Results – Next Steps

Test and compile to both Linux and Windows various previously developed solutions.

Terminal

File Edit View Search Terminal Help

```
##################################################
Rx System Console
##################################################
Local Machine Address: 127.0.0.1
Local Machine Receiving Port: 54001
Remote Machine Address: 127.0.0.1
Remote Machine Receiving Port: 54000
Bypass Parameter Estimation: TRUE
Total Number Of Input Bits: 32204
Estimated BER: 0
Speed (Bits/Sec): 2179.35
Rx: Number Of Calculated Sindromes: 74
Rx: Number Of Validated Sindromes: 72
Rx: Number Of No Matched Sindromes: 31
Rx: Percentage Of No Matched Sindromes: 41.8919
Rx: Number Of Validated Pairs: 36
Rx: Number Of Saved Pairs: 29
Rx: Number Of Discarded Pairs: 7
Rx: Percentage Of Discarded Pairs: 19.4444
```

Terminal

File Edit View Search Terminal Help

```
##################################################
Tx System Console
##################################################
Local Machine Address: 127.0.0.1
Local Machine Receiving Port: 54000
Remote Machine Address: 127.0.0.1
Remote Machine Receiving Port: 54001
Bypass Parameter Estimation: TRUE
Total Number Of Input Bits: 31472
Estimated BER: 0
Tx: Number Of Calculated Sindromes: 144
Tx: Number of Saved Pairs: 29
Tx: Number of Discarded Pairs: 6
Tx: Percentage Of Discarded Pairs: 17.1429
```

Results – Next Steps

- Develop and test an **emulator** capable of simulating raw material for binary and real data.
- Develop a **generic key provider server interface** alongside KMS team for both physical layer comms and KMS comms.
- **Improve upon** the previously developed solutions to obtain a fully connected, functional, multi-machine reconciliation layer.