

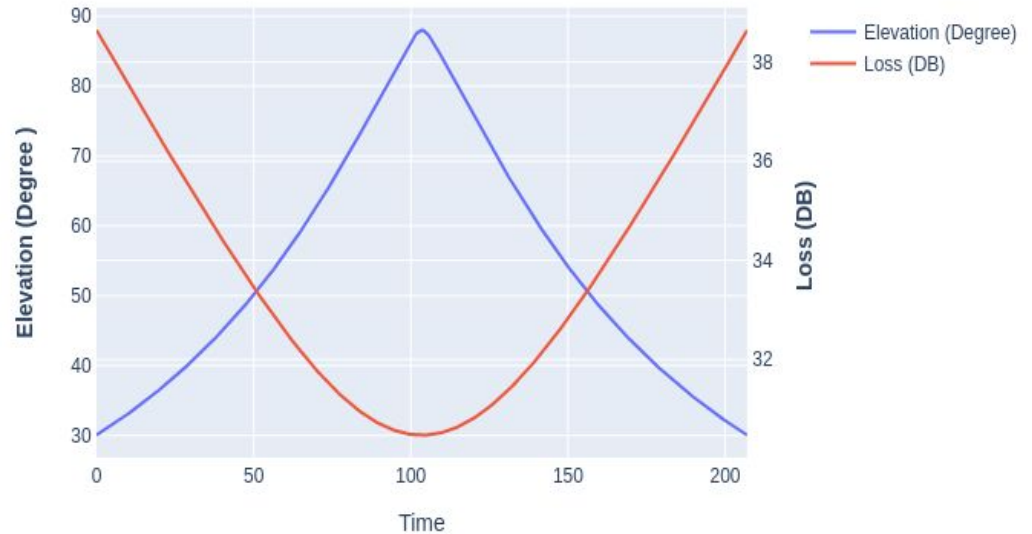
# Finite Key Analysis for Satellite QKD

Ayesha, Lohrman & Tanvir

# Simulating Satellite QKD with Lab data

We simulate a 200 second satellite pass and estimate all the optical, optomechanical And environmental losses.

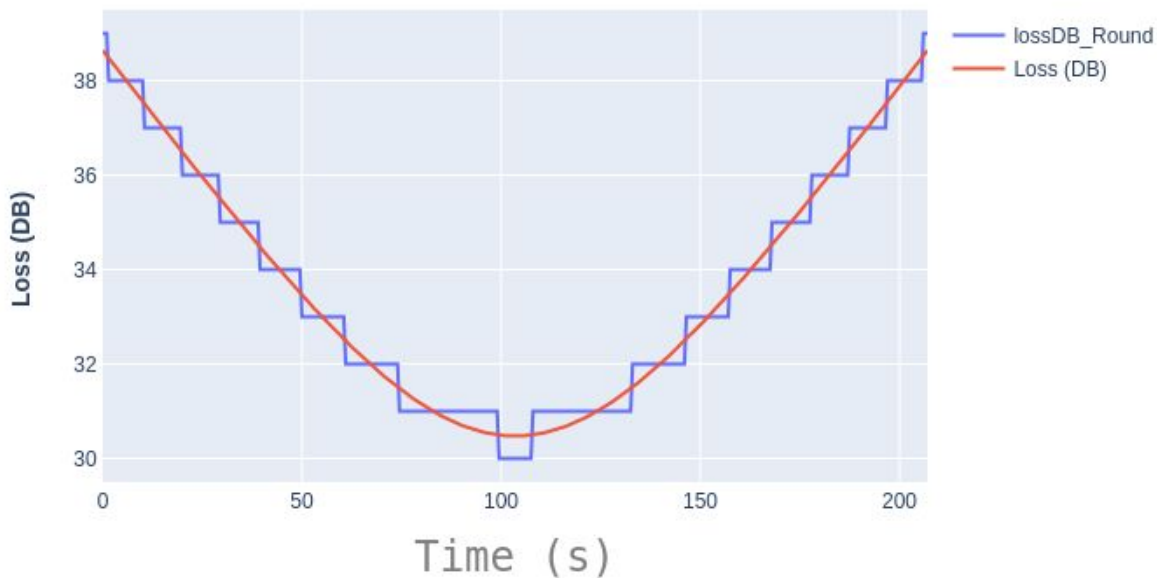
Elevation and Loss progression with time



# Stitching-up lab data to emulate satellite pass

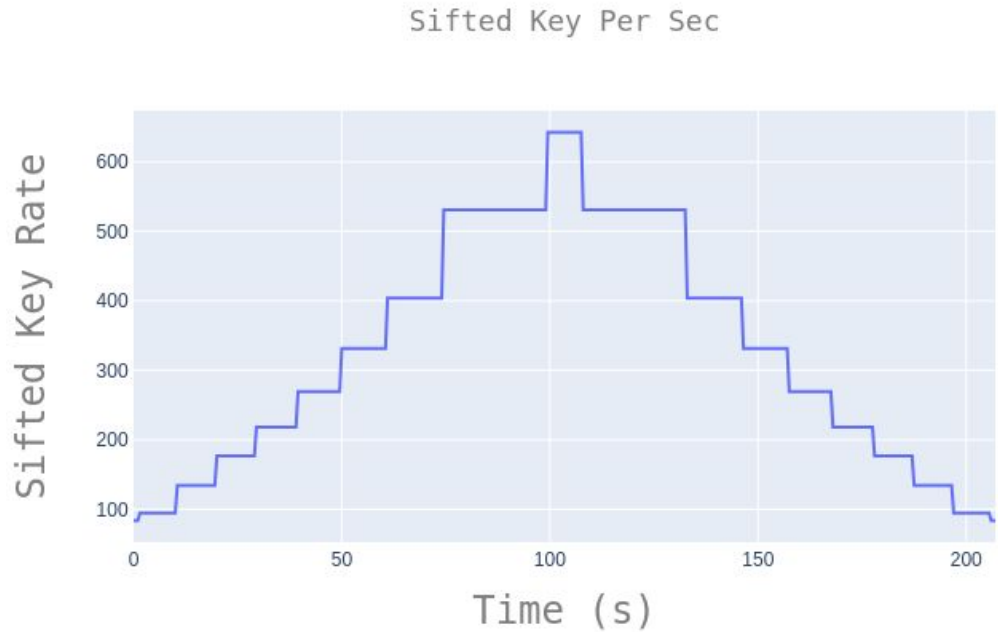
We artificially induce different amount of losses to closely mimic the satellite pass.

Estimated Loss and Loss progression with time



# Sifted Key Rate

Sifted key rate varies with time

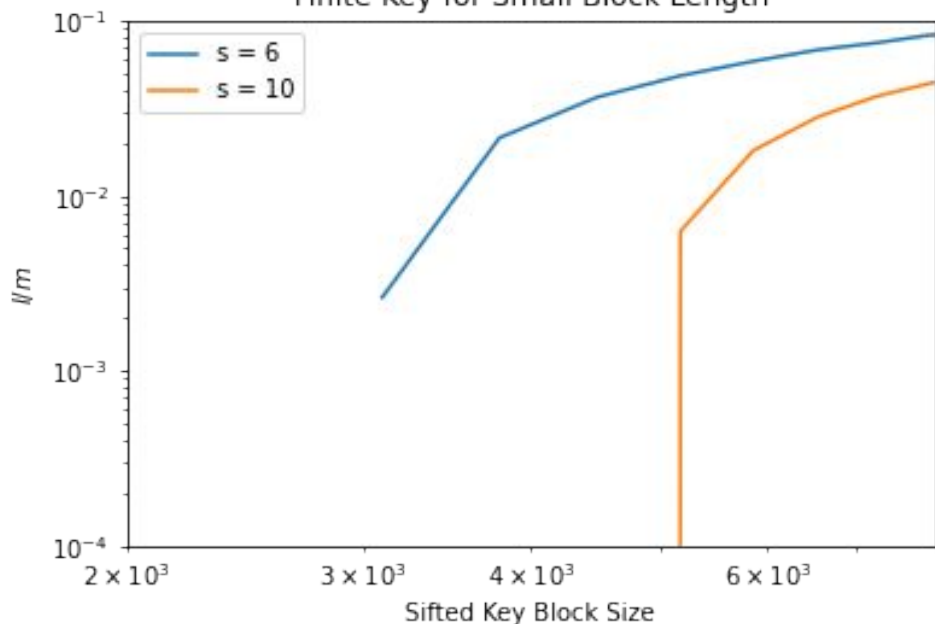


# Time varying QBER

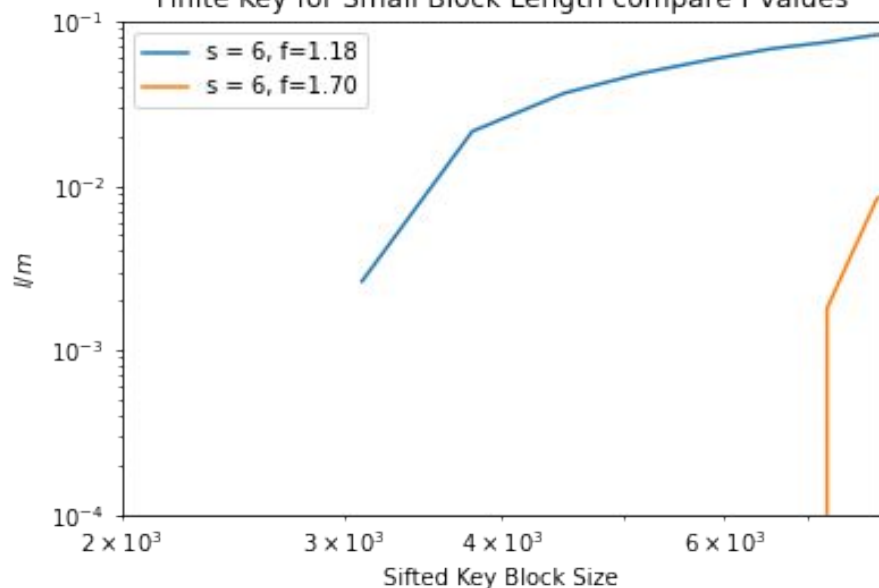


# Finite Key extraction using new results

Finite Key for Small Block Length

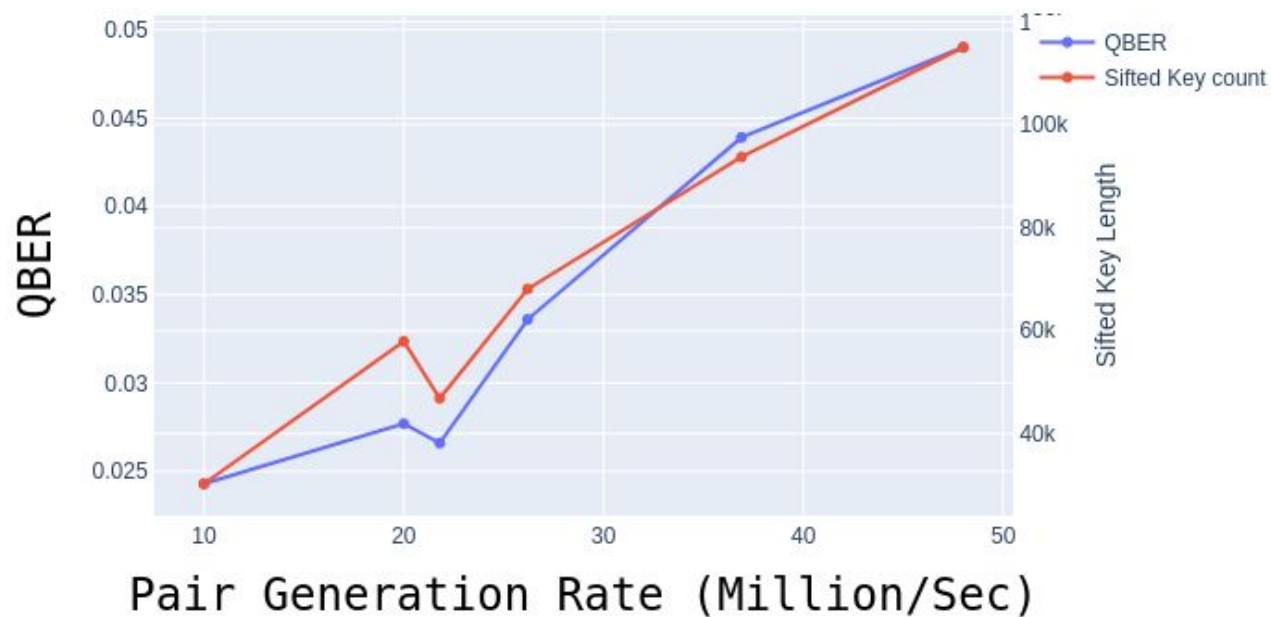


Finite Key for Small Block Length compare f values

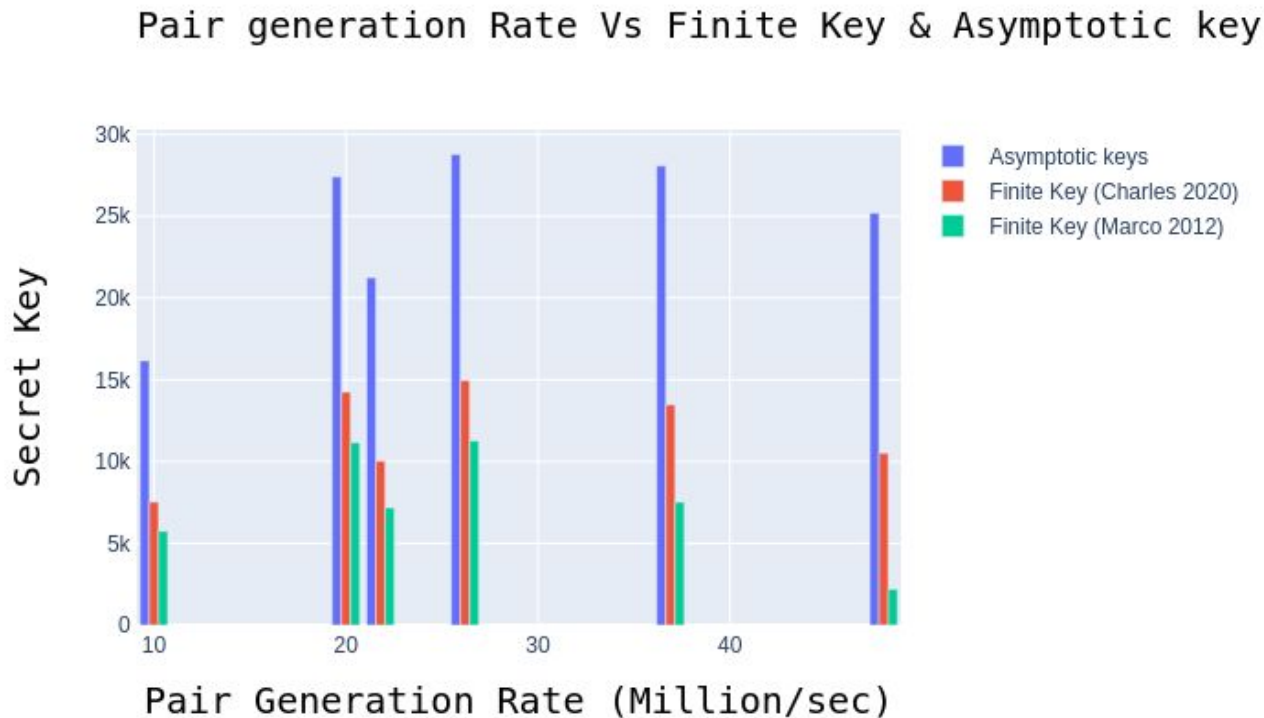


# Combined Sifted Key

Pair Generation Rate Vs QBER And Sifted Key Length



# Finite Key with our Cascade Implementation





# Finite key with $f=1.2$ assumption

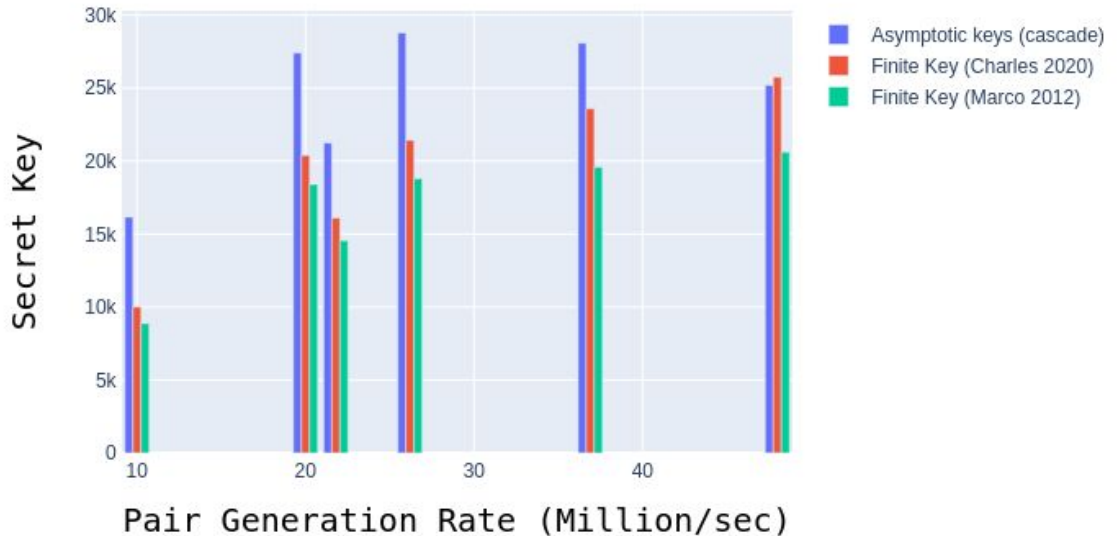
Bit exposed due to syndrome computation during Error correction

$$r = f \cdot h(\text{QBER})$$

Our cascade has  $f$  ranging

From 1.7 to 2

Pair generation Rate Vs Finite Key,  $f = 1.2$



# Comparison with one-shot LDPC

