The realistic threat of a quantum supercomputer has motivated research on post-quantum cryptography. Assuming an attack of a sufficiently large quantum computer, several classical public-key algorithms as RSA become insecure since computationally intensive mathematical problems become easy-to-solve.

The National Institute of Standards and Technology (NIST) has therefore initiated a process to solicit, evaluate, and standardize quantum-resistant public-key cryptographic algorithms, where one promising candidate is based on Low Rank Parity Check (LRPC) codes.

The first task of this research internship is to understand and implement LRPC codes and their known decoding algorithms [1] in the computer algebra system SageMath. Then, existing cryptosystems based on LRPC codes should be investigated [2] and the security of new variants should be determined.


Prerequisites
Basics of Channel Coding
Basics of Python Programming

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