A semi-quantum key distribution (SQKD) protocol allows two users, one of whom is restricted in their quantum capabilities, to establish a shared secret key, secure against an all-powerful adversary. In this paper, we design a new SQKD protocol using highdimensional quantum states and conduct an information theoretic security analysis.
We show that, similar to the fully-quantum key distribution case, high-dimensional systems can increase the noise tolerance in the semi-quantum case. Along the way, we prove several general security results which are applicable to other SQKD protocols (both high-dimensional ones and standard qubit-based protocols).