Title: "The Madrid SDN quantum network"

Abstract:

" A major problem with quantum communications is the fact that quantum signals are easily absorbed or modified during transmission. To reduce this problem, it has been customary in optical networks to use a separate dark fiber as a quantum channel. This implies that a quantum network is a separate infrastructure, which brings problems associated to its cost and deployment. The Madrid SDN network was designed to bring together as much as possible quantum and classical communications networks. By using the Software Defined Networking Paradigm and systems based on Continuous Variables Quantum Key Distribution, we show that a fully integrated -logically and physically- quantum/classical network can be built. This reduces up-front cost and make for a scalable architecture. We demonstrated the concept completely out of the lab, in a network deployed in production facilities of Telefónica Spain and using standard optical communications equipment. Beyond some technical capabilities, like the coexistence of the quantum channel with up to 17 classical ones in the C-Band, in this network we also demonstrated real world use-cases that are industrially significant. The technology can also be used to increase the security level of new network paradigms, like Network Function Virtualization or the SDN itself, for which security model is also a good match. Finally, the scheme is not limited to QKD, but general quantum communications can be easily incorporated."