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## I. Vagniluca - Quantum key distribution: field trials and practical challenges

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Quantum key distribution (QKD, or more generically, quantum cryptography) is today the sole technology able to guarantee unconditional security in sensitive data exchange, as QKD protocols are in principle effective regardless of the computational power available to a potential eavesdropper. Although QKD devices are already adopted outside the laboratories, this technology is still far from a large-scale deployment in existing fiber networks and telecom infrastructures, due to practical issues as low secret-key rate achievable, high costs and high requirements in terms of low-noise fiber links. These practical challenges in experimental QKD are the main topic of my talk. Indeed, my PhD project is focused on QKD in-field demonstrations, with the aim of proving its compatibility with already installed fiber links, while also testing its robustness against classical signals co-propagating through the same fiber. Specifically, I will address two QKD field-trials involving a metropolitan fiber channel in Florence and a submarine fiber link between Sicily and Malta. In addition, I will show the results of my collaboration with Technical University of Denmark, in which we set up a prototype for high-dimensional QKD, with the aim of increasing the secret-key rate achievable while maintaining a cost-effective experimental apparatus.