PhD in Electrical, Electronic and Communication Engineering

Research Title: MOON (Multi-layer Orchestration of Optical Networks)

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Context of the research activity	Elastic optical networks Physical-layer-aware networking Network orchestration Machine Learning
Objectives	Purpose of MOON is the multilayer optimization of elastic optical networks down from the IP layer, enabling full exploitation of the photonic layer - at 100 Gbps and beyond - either using the state-of-the art WDM fixed-grid, either the already standardized flex-grid. The student will take advantage of the 20-year experience of the OptCom group in modelling and simulation of physical layer in optical networks. MOON will evolve in strict interaction with the consortium Telecom Infra Project (TIP) aimed at developing open source code for network equipment. Software modules will be developed in Phyton language using Github. Researchers of MOON will collaborate with companies of TIP. Such us Cisco, Facebook, Juniper Networks, Microsoft, Coriant Networks, OpeFiber, and Microsoft. A collaboration with UTD for ProNet development will be also part of MOON, as well as a collaboration with TOP-IX. MOON will include also experiments that will be carried out exploiting commercial equipment and possibly operating on real data. Activities within MOON will include the use of Machine learning to increade the accuracy in quality of transmission estimation based on network telemetry.

Skills and competencies for the development of the activity	• Digital communications • Optical transmission • Quality-of-transmission estimation for optical tranmission • First three-layer networking • Python coding exploiting parallel computing • Use of tensor-flow library for machine learning