**Oxides on Silicon and Sapphire substrates for photonic applications**

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Intensive researches are currently focused on the miniaturization of devices and on the combination of photonics and electronics in the same platform, in order to decrease the power consumption and to create novel functionalities. In this context, the hybrid integration of oxides on silicon is promising to bring other properties (such as multiferroicity or piezoelectricity) that can be combined and tuned at the nanoscale to develop new devices. However, such integration induces scientific and technological challenges to overcome.

The aim of the project is to develop innovative silicon photonic devices by integrating complex epitaxial oxide thin films on silicon and to optimize their physical properties. This work is mainly focused on the optimization of the materials including the crystalline quality, the control of strain fields and the interfaces between oxide and silicon.

The experimental study includes the growth of oxide layers on silicon and sapphire substrates by pulsed laser deposition and their characterization by several complementary techniques, such as X ray diffraction, AFM-SEM microscopies, and Raman spectroscopy. Furthermore, the first fabrication and characterization of optical waveguides will be presented and discussed.