Title: **Emergent two-dimensional superconductivity at the interface with the charge-ordered semiconductor BaBiO3**

Abstract:

In the last decades, the scientific community has devoted a great effort to find new emerging properties at the interfaces of oxide heterostructures with the aim of diversifying the functionalities of existing electronic devices. Oxide materials enable the possibility of controlling the different electronic degrees of freedom, the interrelation among them and/or with the crystal structure and its dynamics. This is the clue to design new devices with novel technologies in which the interface between the constituent materials plays a fundamental role.
In this talk, I will focus on a particular compound, $BaBiO_3$, that is an intriguing material already in its bulk form. It is superconductor in the vicinity of a charge-density wave ordered phase and despite the absence of magnetic instabilities, the critical temperature can be considerably high. Interestingly, 2D superconductivity has been observed through magnetotransport studies at the interface with another non superconducting oxide material, $BaPbO_3$. By means of *ab-initio* calculations, I will describe the electronic and crystal reconstruction and show that there is a partial suppression of the $BaBiO_3$ charge order at the interface, with a concomitant emergence of 2D metallic states. We then study their coupling to the interfacial phonon modes and suggest that the electron-phonon coupling is the physical mechanism behind the observed 2D superconductivity. This finding indicates that the breaking of charge ordering at interfaces can be a new strategy to triggers fascinating 2D phenomena. At the end of the talk, I will describe some work in progress on the Pb-free $BaSnO_3$/$BaBaO_3$ bilayer both regarding the theoretical predictions and the experimental realization through Pulse Laser Deposition.