



Istituto SPIN  
Genova, L'Aquila, Napoli, Salerno



Consiglio Nazionale delle Ricerche

## AVVISO DI SEMINARIO

**Giovedì 12 Luglio ore 15.00**  
**Aula 2G26 M.S.A.**

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# **“Formation mechanism and voltage/light induced memory effects in 2-dimensional electron gases at oxide interfaces”**

### **Abstract:**

Two-dimensional electron gases (2DEGs) at oxide interfaces, as  $\text{LaAlO}_3/\text{SrTiO}_3$  and its several variants, show multiple functional properties of major physical interest, including a high low-temperature mobility, superconductivity, a large Rashba spin-orbit coupling, an exceptionally large spin-to-charge conversion efficiency and a yet controversial magnetic ground, that can be stabilized by atomic engineering. Furthermore, such properties are tunable under external control parameters, such as electric field effect, as widely investigated in last years, and by light, investigated so far to a lesser extent. A model able to show a predictive power and to account for the conductivity of different oxide interfaces, having either a crystalline or an amorphous overlayer, is still missing. In this talk, a number of experiments on amorphous, crystalline and hybrid conducting interfaces will be described, allowing to clarify similarities and differences in the 2DEG formation mechanism. We also report on the peculiar low-temperature electric transport behavior of the 2DEG formed at the amorphous- $\text{LaGaO}_3/\text{SrTiO}_3$  oxide interface, under the combined application of field effect and light. We show that, by suitably applying a gate voltage pulse, a metastable insulating conducting state can be induced in the sample, and that such state can be erased by light. This memory effect is analyzed in detail and the analogy with memristive devices is discussed.

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