



# Seminar@ISM

organized by  
Communications Group



**CNR**  
Istituto di Struttura  
della Materia

## When?

January 23, 2025  
11:30AM (CET)

## Where?

@ Meeting room  
CNR-ISM -  
Montelibretti branch  
Ed. 15

@MS Teams  
<https://tinyurl.com/24wchbfy>



**Blue Sky Research**



**ICT & Security**

# 23

January 2025

## Giuseppe Maruccio

University of Salento  
Omnicos laboratories  
Italy

## ***Hybrid spintronics: from nanoscale to microwave devices and quantum sensing***

*The continuous drive for miniaturization and enhanced functionality defines the trajectory of modern applied research. Spintronics emerges as a key enabler in this evolution, leveraging the spin degree of freedom and novel magnetic materials to push the boundaries of both fundamental understanding and technological innovation.*

*This presentation will outline the research activities and achievements of the Omnicos group. Nano-spintronics investigations focus on multilayered and nano- devices, demonstrating spin filter effects and the interplay between spin-polarized and single-electron tunneling phenomena. Magnetoresistive transducers are being designed for integration into biosensors and lab-on-a-chip platforms, advancing diagnostics. Additionally, multiferroic materials like BiFeO<sub>3</sub> are studied for their potential in multifunctional devices. Efforts are also directed toward optimizing surface acoustic waves and microwave cavity resonators for coupling with magnetic systems. For instance, our work explores strong coupling (anticrossing) between microwave photonic modes in a three-dimensional cavity and the magnetostatic mode of a YIG sphere from a fundamental point of view and also for quantum sensing applications.*

Info at  
**[www.ism.cnr.it/seminar-ism](http://www.ism.cnr.it/seminar-ism)**

**[info@nm2lab.com](mailto:info@nm2lab.com)**

