

# Curriculum

## Matteo Salvato

**Actual Position:** Researcher - Physics of Matter

**Permanent Address:** Physics Department at the University of Rome "Tor Vergata", Via della Ricerca Scientifica 1, 00133 Roma, Italy

### **Activity research:**

The research is developed in the field of Physics of Matter and assumed an experimental character in the following main activities:

**Thin Film Fabrication:** Different deposition techniques as Molecular Beam Epitaxy, Sputtering and Electron Gun have been used to obtain superconductors, semiconductors and metals thin films as such as superlattices and heterostructures based on these materials. The most relevant are superconducting/ferromagnetic, superconducting/insulating oxides to study both their transport and structural properties.

**X-Ray:** High resolution X-ray analysis has been widely employed to study the interface and the structural properties of thin films and heterostructures. Both reflectivity and high angle techniques have been used to study the disorder at the interface between different layers of superlattices and the structural disorder at atomic unit cell level in thin films. The effect of the substrate on the lattice dimension and structure has been investigated for different materials as magnetic and superconducting oxides and metals.

**Superconductivity:** The transport properties of heterostructures formed by low or high temperature superconductors as Nb, Ta, Pb, YBCO, BSCCO with magnetic or insulating layers have been studied to understand the influence of different materials on superconductivity. Also the transport properties of artificial superlattices based on oxide insulating layers have been investigated. Josephson effect has been studied on specific arrays of junctions eventually integrated with optical waveguides.

**Carbon Nanotubes:** Transport properties of Carbon Nanotubes have been investigated in a wide temperature range confirming the great potentiality of these materials for nanoelectronic applications. Doped and covered Fiber of Carbon nanotubes have also been studied as a basis for hybridization in nanotechnology applications.

**Teaching:** Appointed at the courses of "*Experimental Physics II*" at Media and Communication Science, "*Thin Films Growth*" at Science of Materials and "*Physical Properties of Low Dimensional Semiconducting Materials*" at Physics. Assistant at the courses of "*Laboratory III*" and "*Electronic Laboratory*" at Physics and Science of Materials at the University of Rome "Tor Vergata".

### Some most recent publications:

- 1) "Occurrence of a High Temperature Superconducting Phase in  $(CaCuO_2)_n/(SrTiO_3)_m$  Superlattices" D. Di Castro, M. Salvato, A. Tebano, D. Innocenti, C. Aruta, W. Prellier, O.I. Lebedev, I. Ottaviani, N.B. Brookes, M. Minola, M. Moretti Sala, C. Mazzoli, P.G. Medaglia, G. Ghiringhelli, L. Braicovich, M. Cirillo, G. Balestrino **Phys. Rev. B** **86**,134524(2012)
- 2) "Transport Mechanism in Granular Ni Deposited on Carbon Nanotubes Fibers" M. Salvato, M. Lucci, I. Ottaviani, M. Cirillo, E. Tamburri, S. Orlanducci, M.L. Terranova, M. Notarianni, C.C. Young, N. Behabtu, M. Pasquali **Phys. Rev. B** **86**, 115117(2012)
- 3) "Macroscopic Effects of Tunneling Barriers in Nanotube Bundles Aggregates" M. Salvato, M. Cirillo, M. Lucci, S. Orlanducci, I. Ottaviani, M.L. Terranova, F. Toschi **J. Phys. D: Appl. Phys** **45**, 105306(2012)
- 4) "Weak Localization and Dimensional Crossover in Carbon Nanotube Systems" M. Salvato, M. Lucci, I. Ottaviani, M. Cirillo, S. Orlanducci, F. Toschi, M.L. Terranova **Eur. Phys. J. B** **85**, 109 (2012)
- 5) "Low Temperature Conductivity of Carbon Nanotube Aggregates" M. Salvato, M. Lucci, I. Ottaviani, M. Cirillo, S. Orlanducci, E. Tamburri, V. Guglielmotti, F. Toschi, M.L. Terranova, M. Pasquali **J. Phys. Condens. Matter** **23**, 475302(2011)
- 6) "Effect of Potassium Doping on Electrical properties of Carbon nanotube Fibers" M. Salvato, M. Lucci, I. Ottaviani, M. Cirillo, E. Tamburri, I. Cianchetta, V. Guglielmotti, S. Orlanducci, M.L. Terranova, M. Pasquali **Phys. Rev. B** **84**, 233406(2011)
- 7) "Carbon Nanotubes Guides for Nickel Electrical Interconnects" S. Orlanducci, E. Tamburri, V. Guglielmotti, F. Toschi, M.L. Terranova, M. Lucci, I. Ottaviani, M. Salvato, M. Cirillo, **IEEE Trans. on Nanotech. Vol. 10, Issue 4, pg764 ISSN: 1536-125X (2011)**
- 8) "Collective Cavity Mode Excitations in Arrays of Josephson Junctions" I. Ottaviani, M. Cirillo, M. Lucci, V. Merlo, M. Salvato, M.G. Castellano, G. Torrioli, F. Mueller, T. Weimann **Phys. Rev. B** **80**,174518 (2009).
- 9) "Charge Transport and Tunneling in Single Walled Carbon Nanotubes" M. Salvato, M. Cirillo, M. Lucci, S. Orlanducci, I. Ottaviani, M.L. Terranova, F. Foschi, **Phys. Rev. Lett.** **101**, 246804(2008).
- 10) "Integrating Superconductive and Optical Circuits" F. Stella, M. Casalboni, M. Cirillo, V. Merlo, C. Palazzesi, G. Pepe, P. Proposito, and M. Salvato, **Appl. Phys. Lett.** **92**, 202505 (2008)
- 11) "Surface and Structural Disorder in MBE and Sputtering Deposited Cu Thin Films Revealed by X-Ray Measurements",M. Salvato, A. Aurigemma, A. Tesauro, C. Attanasio, **Vacuum** **82**, 556-560 (2008)
- 12) "Electron Spectroscopy Study in the NbN growth for NbN/AlN interface", M. Lucci, S. Sanna, N. Zema, V. Merlo, M. Salvato, H.N. Thanh, I. Davoli **Surface Science** **601**, 2647(2007)