**La lunga tradizione di IMM nello studio dei materiali a cambiamento di fase: dalla sintesi alle applicazioni**

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I materiali a cambiamento di fase (PCM) mostrano una combinazione unica di proprietà che fino ad oggi si trovano solo in una gamma limitata di materiali generalmente contenenti antimonio e/o tellurio. In questo seminario presenterò gli aspetti fondamentali della ricerca sui materiali a cambiamento di fase concentrandomi in particolare sulla struttura, le proprietà e le applicazioni dei PCM. Dopo l'introduzione delle proprietà di base, mi soffermerò sui contributi dati da IMM l campo delle PCM. Nell’ultima parte del seminario presenterò gli ultimi risultati ottenuti nell’ambito di una cooperazione interna IMM.

**Raffaella Calarco, Research Director**

She received her Master’s degree in Physics in 1996 from the University of Rome Tor Vergata. She holds a Ph.D. in Material Science in 2001 from the University of Rome La Sapienza. From 2000 to 2001 she worked as a Post-Doc at the University of Aachen (RWTH). From 2001 to 2010 she was with the Research Center Jülich, Germany, at first in the “Tenure-track”- excellence program and then as a Senior Research Scientist, focusing on III-nitride nanowires. In 2010 she received the Habilitation in Physics from the RWTH Aachen and in 2012 from the Humboldt University in Berlin. In 2013 she obtained the Habilitation to full Professor competitions in Italy (validity till 2023). In September 2010 she joined Paul-Drude Institute for Solid State Electronics, Berlin, Germany (PDI). From September 2019 she is with National Research Council of Italy (CNR), Institute for Microelectronics and Microsystems (IMM). Her current research interests is on growth of phase-change materials for memory applications.

For almost 25 years she has gained in-depth knowledge of material growth using molecular beam epitaxy (MBE). In addition she gathered knowledge and experience in several fields and used various experimental techniques for the fabrication and characterization of different materials and structures. R. Calarco mastered both the synthesis of the materials and the understanding of their properties, with the goal of exploiting new device concepts. She fabricated and investigated using different techniques thin layers and also epitaxial and non-epitaxial hybrid structures. Furthermore, she grew different self-organized nanostructures such as nanowires and quantum dots.

The material systems R. Calarco worked with are listed in the following:

III-Nitrides (GaN, AlN, InN and their ternary and quaternary alloys); GaN:Mn, GaN:Cr (obtained by implantation); GaN/Fe (epitaxial growth); Co/ AlOx / Co – Mo – Fe; Si – SiGe – Ge; GeTe-Sb2Te3 (and generally phase change materials); h-GaTe.

She is author or co-author of about 140 publications, 28 proceedings, 64 invited talks, 4 book chapters, 6 invited review papers, and 2 patents 1 sold to Micron Technology.