

Materials Science and Device Architecture of Resistive Random Access Memories

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ABSTRACT

The purpose of this tutorial is to present a systematic route to materials design and property control of non-filament based ReRAMs.

Starting with a survey of current ReRAMs, in which filaments and sometimes Electroforming, are needed to provide the Metal-Insulator transition, the ReRAM universal model and recent developments are presented for the first time in a tutorial format.

The majority of the time after the survey of current devices, will be dedicated to Correlated-electron Random Access Memories (CeRAMs) which has been discussed in recent articles in the literature (see also: http://www.eetimes.com/author.asp?section_id=36&itc=eetimes_sitedefault&doc_id=1320905&page_number=2).

The course is aimed at providing a vast amount of data in the novel conditions in which device physics and materials are optimized to achieve good properties and new paths for research into zone controlled Mott switching – a novel feature of this new device (CeRAM).

ABOUT THE INSTRUCTORS: Carlos Paz de Araujo and Jolanta Celinska, are well known researchers from Symetrix Corporation and University of Colorado (Colorado Springs). Together they have over 40 years of Materials and Device technologies and Device Physics in FeRAMs and CeRAMs, with over 1.7 Billion Devices in the field. Their work includes over 200 US Patents and numerous publications in Journals and presentations in conferences.

This tutorial is linked to Dr. Paz de Araujo's keynote lecture in which the official exposition of CeRAM to the world community will be made.