

CONDENSED MATTER SEMINAR

Thursday 19 May at 14.00

“The imperfect organic semiconductors: from fundamentals to applications”

Oana D. Jurchescu

Department of Physics and Center for Functional Materials
Wake Forest University, Winston-Salem, NC 27109

Our society has become increasingly dependent on electronic devices, which are now integrated into all aspects of our lives: medical applications controlled by specialized electronics save lives in the hospitals, displays produce the most vivid pictures, computers and cell phones keep us connected even during the worst pandemic lockdowns. The emerging Internet of Things (IoT) promises to enhance the quality of our lives even further by providing access to new types of applications and, with that, fundamentally changing the way we interact with electronics. Organic semiconductors are at the forefront of such a revolution due to their low cost, lightweight, and ease of processing. A mind-blowing array of new products include rollable displays, tattoo-like smart bandages that inform medical professionals in real time, conformable electronics inserted into clothes and even human body. Emerging exciting applications are near validation, hindered only by insufficient performance and stability. In this presentation I will focus on several opportunities and challenges faced by organic materials and devices. Organic semiconductors are highly susceptible to defect formation, owing to their weak intermolecular interactions, and the electronic states formed in the gap can change the properties significantly. In this presentation I will discuss the origin and energetic distribution of several different types of traps in organic semiconductors and their impact on device performance. Several methods for minimizing the trap density to enhance the performance and stability will be presented. Lastly, trap formation will be exploited for the development of radiation dosimeters for cancer treatment.

Host: Moritz Riede
Zoom