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### **Organic Light Emitting Diodes – What can EPR tell us?**

Organic light emitting diodes (OLEDs) are making steady inroads into display and lighting technologies, with many advantages in terms of cost of production, size of display, mechanical flexibility, brightness and contrast ratio. The first OLED televisions have already been demonstrated. However, there are questions about the efficiency and effective lifetime of the materials, particularly the blue emitters. Defects and impurities in the OLED materials are expected to contribute to these limitations through their role as trapping or non-radiative recombination centres. Although such centres directly affect bulk properties such as light output and electrical conduction, there is a shortage of techniques which can probe them at the atomic or molecular level.

One such technique that has proven valuable for inorganic diodes, is Electron Paramagnetic Resonance, EPR, which gives information on the geometry, nuclear spin, and electronic wave functions of any species with unpaired electrons. In the case of OLEDs, EPR using conventional microwave absorption is difficult to apply directly because the thin films simply contain too few spins for adequate sensitivity. However, optical or electrical detection not only has the necessary sensitivity, but also involves the very processes of prime interest, that is electrical conduction and light emission.

In this presentation, a short review of EPR in the context of OLEDs is first given to set the background for a subsequent discussion of our results for the electrically and optically detected EPR of yellow and red emitting OLEDs based on ITO/PEDOT:PSS/PPV/Ca structures. The devices show surprisingly large EPR effects at room temperature, and also magneto-resistive and magneto-electroluminescence effect at low fields. The possible origin of the effects in terms of trapping centres is discussed.

Die Vortrag findet um **15:30 Uhr** im Gebäude der Materialwissenschaften,  
Lichtwiese, Petersenstr. 23, **Raum 128** statt