TECHNISCHE UNIVERSITÄT DRESDEN

Bereich Mathematik und Naturwissenschaften Fakultät Physik

PHYSIKALISCHES KOLLOQUIUM

Referent: **Dr. Hans Kleemann**

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Thema: **Organic Electronics – New Horizons** (Vorstellung für Habilitation)

Zeit und Ort: Dienstag, 17.7.2018, 16:40 Uhr
Recknagel-Bau, Hörsaal REC/C213, Haeckelstr. 3

Leiter: Prof. Dr. Karl Leo

Kurzfassung: The vision of large area and flexible electronics will create new fields for electronic applications, such as wearable devices, implantable sensors or even artifical skin. Ultimately, electronic devices will become our daily companion – anytime and anywhere. Organic semiconducting materials have gained increasing scientific and commercial interest because they potentially enable a cost-effective production of flexible electronics circuits on virtually any kind of substrate. Flexible, integrated circuits and even full micro-processors processed at room temperature have been demonstrated using organic thin-film transistors (OTFTs). However, the electrical performance and the device-to-device reliability of state-of-the-art OTFTs are still too poor for many applications. Hence, flexible consumer devices remain a vision for the future and the lack of electrical performance requires exploring new material and device concepts. In this talk I will discuss new device and integration concepts for organic thin-film transistors which we have developed throughout the last years. These novel devices, which are based on a vertical architecture, can outperform conventional TFTs and enable circuit operation above 40 MHz, possibly even above 100 MHz representing a milestone for the TFT development. Furthermore, I will highlight our device fabrication protocol which facilitates a robust TFT integration using well-established industrial processes. To go even further, I will discuss as an outlook new strategies based on material engineering to improve the charge carrier mobility in organic thin-films by van-der-Waals epitaxy. These thin-film crystals represent an interesting platform to study phenomena of charge transport and to explore the physics of weakly screened systems.

Biographie: Hans obtained his diploma in physics from the University of Jena in 2009. From 2009-2012 he joined Prof. Leo's group at Technische Universität Dresden where he was focusing organic electronics. After having received his PhD in 2013 from TU Dresden, Hans joined NOVALED/ Samsung SDI as a researcher/ project-leader on organic transistors for display applications. He returned to academia in 2016 and joined the group of Prof. Dr. Feng Wang at the Physics Department of UC in Berkeley, USA. In 04/2017, Hans started as a group leader at TU Dresden where he is focusing on next level organic electronic devices.