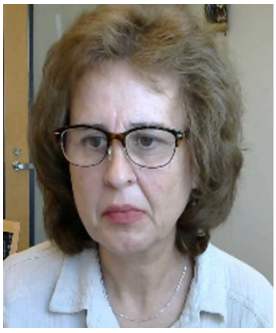
TECHNISCHE UNIVERSITÄT DRESDEN

Bereich Mathematik und Naturwissenschaften Fakultät Physik

PHYSIKALISCHES KOLLOQUIUM

Vortrag:

Prof. Lilia M. Woods
Department of Physics,
University of South Florida,
USA



Thema: **Probing quantum materials properties with Casimir interactions: graphene and Weyl materials**

Zeit und Ort: Dienstag, 31.5.2022, 16:40 Uhr - Hybride Veranstaltung
Vortrag vor Ort in REC/C213
Online Teilnahme möglich:
Zoom-Meeting: Meeting-ID: 657 3543 9074 / Kenncode: PK-22!-LW
https://tu-dresden.zoom.us/j/65735439074?pwd=OS9uL2c2d1pPMTZycWF4Nld4YzhLZz09

Leitung: Prof. Carsten Timm

Kurzfassung: The Casimir force is a universal interaction originating from electromagnetic fluctuations between objects. The Casimir force, in which the electromagnetic exchange happens with the speed of light, is fundamentally the same as the van der Waals force, for which the electromagnetic exchange is instantaneous. This ubiquitous force has far reaching consequences, including for the stability of materials with chemically inert components, biological matter, and nano- and micro-machines. Despite its universal nature, the magnitude, sign, and scaling laws of the van der Waals/Casimir force are strongly affected by the materials response properties and boundary conditions of the interacting objects. The expanding materials library with systems characterized by Dirac fermions and nontrivial topology has opened up new opportunities to probe fundamental physics concepts through Casimir phenomena. Silicene, germanene, stanene are similar to graphene, but the finite lattice buckling and strong spin orbit coupling are the foundation for Casimir force transitions reflecting the array of topological phases in these materials driven by external fields. Bilayered graphene at magic angles, on the other hand, have very strong correlation effects giving rise to nematic states (among others) whose anisotropic response generates Casimir torque. It is even more surprising that the nontrivial topology in Weyl semimetals, the 3D graphene “cousin”, plays a minor role in the Casimir force rendering rather conventional behavior. By presenting an overview of these amazing effects, we show that materials present an excellent platform for new light-matter interaction effects, which in turn serve as a unique probing tool of materials properties.

Biographie: Lilia M. Woods has obtained her PhD under the supervision of Prof. Gerald D. Mahan. After her Postdoc at Oak Ridge National Laboratory and her NRC Fellowship at the Naval Research Laboratory, she became an Assistant Professor at the USF Department of Physics, where she became a Full Professor in 2012. Her research is in the broad area of theoretical and computational condensed matter physics funded by the US National Science Foundation and Department of Energy. She is an APS Fellow and AAAS Fellow. She has also received the Humboldt Research Award by the AvH Foundation.

Get-Together

Im Anschluss an das Kolloquium (ca. 18 Uhr) sind Studentinnen und Mitarbeiterinnen eingeladen zu einem hybriden Get-Together mit Prof. Dr. Lilia M. Woods. Wir treffen uns im Raum B101 und zusätzlich ist die Einschaltung online über Zoom möglich. In diesen Rahmen gibt es die Gelegenheit, mit der Referentin ins Gespräch zu kommen und sich über weibliche Perspektiven auf Herausforderungen in Studium und Berufsleben auszutauschen.

https://tu-dresden.zoom.us/j/61039131592?pwd=TGRCY21uaThSVnkyWmxtbU5kbGhMZz09

Meeting-ID: 610 3913 1592 Kenncode: GetTog#1

The colloquium will be followed by a Get-Together with Prof. Dr. Lilia M. Woods in Room B101 and online in Zoom (about 6 p.m.). Female students and staff are invited to talk to the speaker and discuss female perspectives on challenges in studies and professional life.