

Invitation to IQST Seminar

on Tuesday, August 7th, 2018, 1pm
University of Stuttgart, Campus Vaihingen,
Pfaffenwaldring 57,
3rd Physics Institute,
Seminar room 6.331



Prof. Dr. Kirk Madison, UBC Vancouver

Title : The Quantum-Pascal - a self-defining UHV pressure standard

Abstract : The van der Waals force between particles plays a fundamental role in a vast array of fields including chemistry, biology, and physics. We show here that this ubiquitous force also makes a stationary atom an ideal and self-defining, absolute particle flux sensor and primary pressure standard for UHV.

In brief, the passage of a particle through the collision cross section of the cold sensor is detected by the momentum transfer to it, and the incident particle flux is the single-particle collision rate divided by the total cross section. Crucial to this application, we show how quantum measurement effects can be exploited to simultaneously determine the total collision cross section and background density for any incident species thus realizing a universal and self-defining UHV or XHV pressure standard. We also discuss how this work has implications for all particle loss from shallow traps induced by collision with room temperature background gas.

Host: Dr. Ilja Gerhardt, 3. Phys. Institut; University of Stuttgart