



CRC 1227
Designed Quantum States of Matter



GUEST LECTURE

Dr. Stefan Danilishin

Institute for Theoretical Physics and
Institute for Gravitational Physics,
Leibniz Universität Hannover
(Guest of Prof. Dr. Piet O. Schmidt and
Prof. Dr. Klemens Hammerer)

Leibniz Universität Hannover
Welfengarten 1, 30167 Hannover
(building 1101)
Seminar room D326
at the Institute of Quantum Optics
02 November, 2017, 3:30 pm

"Using quantum non-demolition measurement of speed to hear distant echoes of colliding black holes and neutron stars with the next generation of GW interferometers"

The recent detections of gravitational waves (GW) from the colliding black hole binaries by the two LIGO interferometers and Virgo interferometer has not only heralded the era of gravitational wave astronomy, but has also emphasised the importance of enhancing the sensitivity of GW instruments in the low frequency band (1-30Hz), containing the lion share of the GW emission spectrum of a compact binary sources. In this range of frequencies, the dominant fundamental noise source of the GW interferometers is quantum back-action produced by random fluctuations of light intensity. In my talk I will give an overview of the state of the art of interferometric detection of GWs and will discuss how one can suppress this low frequency component of quantum noise by turning the GW detector into a quantum non-demolition (QND) speed measuring device. I will also tell about different possible realisations of speed meters and discuss the pros and cons of these schemes.

**All DQ-mat members and all interested
are cordially invited to attend.**