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Quantum Optics,
Quantum Nanophysics
& Quantum Information

INVITATION

to a **TALK** by

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Determining interaction and folding of proteins at the single molecule level with optical tweezers

Tuesday, January 10th 2023, 15:00 h

Location: Ernst-Mach Lecture Hall, 2nd floor, Boltzmanngasse 5

Hosted by: Markus Arndt

Abstract:

The effect of force on protein structure and associated changes of protein function is a subject of current intensive research. Mechanical forces are generated in the cell during processes as diverse as chromosomal segregation, replication, transcription, translation, translocation of proteins across membranes, cell locomotion, and catalyzed protein and nucleic acid folding and unfolding, among others. Currently, some techniques have been developed to allow direct measurements of mechanical forces that certain biological processes generate (force spectroscopy techniques). One of the techniques is the optical tweezers (OTs) that allows the manipulation of single molecules, such as proteins, and measure force in the piconewton range with good precision. OTs are based on optical trapping, where a laser is used to exert a force on a dielectric bead; and optically trap the bead at a controllable position in all three dimensions. This methodology has made it possible to observe events of protein folding at single molecule level and determine the kinetics. It also allows us to carry out experiments while in conditions of non-equilibrium and use the Crooks fluctuation theorem to obtain the equilibrium information. In this talk I will focus on an essential process in the cell: protein-protein interaction during translocation from the cytoplasm to the endoplasmic reticulum.