Speaker: **Jan Neuser**

Title: **The Prodiabatic Elimination: A Method Beyond the Adiabatic Elimination**

Date: **Thursday, November 28th, 11:00 am (s.t.).**

Place: **Seminar room 915**

Title: **The Prodiabatic Elimination: A Method Beyond the Adiabatic Elimination**

Abstract:

Obtaining time-dependent descriptions of physical systems is a key goal in physics; after all, who doesn't want to predict what will happen in the future? But because nature is often complex, physicists have developed various tools and approximations to unravel its behavior. This talk will focus on a two-level system embedded in a driven optical cavity, which can be used to alter the statistical properties of light. To achieve this, a laser adds coherent light to the cavity, allowing photons to interact with the two-level system. Additionally, one side of the cavity is semitransparent, allowing light to exit. We are interested in the g(2)-function, which quantifies the statistics of photons leaving the cavity. The widely used method of adiabatic elimination provides a way to approximate the dynamics, but its assumptions and limitations can sometimes be restrictive. To address this, we have developed the prodiabatic elimination, a new technique that relaxes some of these assumptions. This approach outperforms the adiabatic elimination in a range of parameters and is able to correctly incorporate initial conditions. By extending the toolkit for the analysis of quantum systems, this work opens up new possibilities for understanding quantum optics and perhaps more.