

PHYSICAL COLLOQUIUM
INVITATION

Monday, 16.04.2018, 4.15 p.m., W2-1-148

speaks

Dr. Vlaho Petrovic,

AG Windenergiesysteme, Institut für Physik,

Carl-von-Ossietzky-Universität, Oldenburg, Germany

about

**“Wind farm control concepts for compensation of wake induced power
losses and structural loads”**

Wind energy has been growing rapidly in recent decades, and it is currently the main alternative energy source. In order to reduce construction, maintenance and commissioning costs, wind energy production is typically organised in wind farms rather than single isolated wind turbines, leading to wake interactions among different turbines, which can lead to power losses and increased structural loads. Traditionally, these interactions have been neglected by wind farm controllers, and each wind turbine has been optimizing its own performance. However, as it has been shown in recent years, a coordinated wind turbine operation can significantly improve the performance of the wind farm by either reducing or completely eliminating unwanted wake interactions. This talk will focus on our recent progress in wind farm control concepts for compensation of wake effects. Different control objectives will be introduced, with the main focus on the active power control, which enables wind farms to participate in the provision of ancillary services, thus enabling a higher wind energy penetration in the power grids. As special cases of the active power control, wind farm power maximization and reduction of wind turbine structural loads will also be addressed. Wake control strategies, i.e. wind farm actuators suitable for achieving the set objectives will be explained and validated, and it will be shown how they can be exploited in control algorithms. The application of optimal control theory will be compared with more traditional model free control approaches in terms of control system complexity and performance.

All interested persons are cordially invited. Sgd. Prof. Dr. Martin Kühn