Arbeitskreis junge DPG (AKjDPG)

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On occasion of the Nobel Prize in Physics 2017 for the observation of Gravitational Waves, jDPG has organised jointly with GR a tutorial on Monday morning which focus this highly interesting field of research. It is aimed to provide an introduction in particular for participants without a background in General Relativity.

Furthermore, Lunch Talks will be given from Tuesday until Thursday during the lunch breaks. These talks provide insides into different working areas for physicists outside academia.

Everyone, who wants to network with other young participants and get to know Würzburg at night, is welcomed to join the jDPG on a pub crawl and to network with other young participants. We meet on Wednesday, 20:00, at Vierröhrenbrunnen (Beim Grafeneckert, Tram stop Rathaus).

Overview of Tutorials and Lunch Talks

(Lecture room Z6 - HS 0.001)

Tutorial

AKjDPG 1.1	Mo	9:00–10:30	Z6 - HS 0.001	**Gravitational Waves - Theory and Observation** — •Claus Kiefer
AKjDPG 1.2	Mo	11:00–11:45	Z6 - HS 0.001	**Detecting gravitational waves** — •Markus Pössel
AKjDPG 1.3	Mo	11:45–12:30	Z6 - HS 0.001	**Numerical simulations of black hole and neutron star systems** — •Bernd Brügmann

Lunch Talks

PV IV	Di	13:15–13:45	Z6 - HS 0.001	**Technischer Vertrieb als Schlüsselposition im Unternehmen** — •Tobias Mauerer
PV VIII	Mi	13:15–13:45	Z6 - HS 0.001	**Physiker in der Automobilindustrie** — •Hartmut Presting
PV XI	Do	13:15–13:45	Z6 - HS 0.001	**Zwischen Medizinphysik und Consulting - Klinik 4.0 mit OPASCA** — •Charles Majer

AKjDPG 1: Tutorial: Gravitational Waves

Zeit: Montag 9:00–12:30 Raum: Z6 - HS 0.001

Tutorium AKjDPG 1.1 Mo 9:00 Z6 - HS 0.001
Gravitational Waves - Theory and Observation — •Claus Kiefer — Universität zu Köln

Gravitational waves were first predicted to exist by Albert Einstein in 1916. In September 2015, they were directly detected for the first time. Since then, a couple of other events were registered, among them one for which the optical counterpart has been seen. In 2017, the Nobel Prize for Physics was awarded for the observation of gravitational waves.

In my talk, I give a brief introduction into the physics of gravitational waves and discuss the indirect detection from observations of binary pulsars. I then describe the direct detection by laser interferometry and explain the physics behind it. I conclude with a brief outlook on gravitational wave astronomy and on the role that gravitational waves play for cosmology and quantum gravity.

Ref.: D. Giulini and C. Kiefer, Gravitationswellen (Springer Spektrum 2017)

30 min. break

Tutorium AKjDPG 1.2 Mo 11:00 Z6 - HS 0.001
Detecting gravitational waves — •Markus Pössel — Haus der Astronomie / Max-Planck-Institut für Astronomie, Heidelberg

In this tutorial, we will explore the basics of gravitational wave detection, from pulsar timing to interferometric detectors (with a sidelong glance at resonant detectors). I will try to keep the mathematics as simple as possible, resorting to models and analogies (e.g. with cosmic expansion) wherever feasible. Gravitational waves only interact very weakly with our detectors, which means a gravitational wave signal has plenty of competition in the form of noise. We will consider the most important types of noise, and examine some of the techniques used by detectors like LIGO and Virgo for noise suppression.

Tutorium AKjDPG 1.3 Mo 11:45 Z6 - HS 0.001
Numerical simulations of black hole and neutron star systems — •Bernd Brügmann — Uni Jena

Much anticipated and finally here, the first detection of gravitational waves from black holes and neutron star mergers is a fantastic success for gravitational wave physics. Part of the success story are great advances in numerical general relativity that allow us to simulate binaries with increasing levels of complexity. In this talk we focus on the methods of numerical general relativity which allow us to perform computer simulations of black holes and neutron stars, and how such simulations are connected to actual gravitational wave observations.