Research Training Group
Graduiertenkolleg
Models of Gravity

RTG Models of Gravity Colloquium	
Date:	04.12.2019
Time:	11:00 - 16:30
Location:	Leibniz University Hannover "Königlicher Pferdestall" (Appelstraße 7, 30167 Hannover)

Program	
11:00 - 11:30	Welcome Coffee
11:30- 12:30	Students' Seminar: **Nathalia Aprile** (Sao Paulo, Brazil) *"Holographic Superconductors"*
12:30 - 14:00	Lunch and *board meeting*
14:00 - 15:00	Talk 1: **Bruce Allen** (Hannover, Germany) *"Gravitational wave stochastic background from cosmologicalparticle decay"*
15:00 - 15:30	Discussion and Coffee
15:30 - 16:30	Talk 2: **Jafar Khodagholizadeh** (Tehran, Iran) *"Aschenbach effect for spinning particles in Kerr Spacetime "*
18:00	Dinner at Restaurant Zwischenzeit

Abstracts

Talk 1: **Bruce Allen** (Hannover, Germany)
"Gravitational wave stochastic background from cosmologicalparticle decay"

We assume that cosmological dark matter is composed of massive neutral scalar particles that decay into two massless particles. The decay produces a stochastic background of gravitational waves because of the “memory effect”. We calculate the spectrum of this background, argue that it may dominate at high frequencies, and discuss its potential observability. Penrose has proposed a cosmological model for which dark matter particles have the Planck mass and decay into two gravitons (arXiv:1707.04169). For these, the spectrum has an additional “direct” contribution from the decay products, which we also estimate and discuss.

Talk 2: **Jafar Khodagholizadeh** (Tehran, Iran)
“Aschenbach effect for spinning particles in Kerr Spacetime”

The orbital velocity profile of circular timelike geodesics around a Kerr blackhole has a non-monotonic radial behavior in the Locally Non-rotating Frames (LNRF). Using the Mathisson-Papapetrou-Dixon equations for a massive spinning particle, we investigate this maximum-minimum feature, known as the Aschenbach effect, by considering the spin of a particle. In addition to the black-hole spin, the absolute valueof the particle’s spin also plays an important role for the Aschenbach effect. We determine the critical value of the angular momentum of a Kerrblack hole where the Aschenbach effect sets in as a function of the spin of the probe.

Students’ Seminar: **Nathalia Aprile** (Sao Paulo, Brazil)
“Holographic Superconductors”

In the context of gauge/gravity duality, we study holographic superconductors in 3+1 dimensions away from the probe limit, i.e., taking backreaction of the space-time into account. We consider the case of Gauss - Bonnet gravity.