EP 5: Fundamental Physics

Zeit: Dienstag 13:30–14:30 Raum: Zahnklinik

Hauptvortrag EP 5.1 Di 13:30 Zahnklinik

DFG im Überblick — •Stefan Krückeberg — Deutsche Forschungsgemeinschaft, Kennedyallee 40, 53175 Bonn

In diesem Vortrag wird ein Überblick über die Förderaktivitäten der Deutschen Forschungsgemeinschaft gegeben. Dabei werden zum einen die verschiedenen Varianten der Projektförderung vorgestellt, zum anderen die Programme zur Förderung des wissenschaftlichen Nachwuchses erläutert. Außerdem wird auf aktuelle Entwicklungen eingegangen.

EP 5.2 Di 14:00 Zahnklinik

Fundamental Physics in Microgravity and in Space — •Hansjörg Dittus[1] and Claus Lämmerzahl[2] — [1]DLR, Institute for Space Systems, 28359 Bremen — [2]ZARM, University Bremen, 28359 Bremen

There are many reasons to perform experiments in a microgravity environment or in space: long time of free fall which makes possible to searches for small forces, large differences in the gravitational potential leading to a large gravitational redshift of clocks, large velocities and large distances, and of course a quiet enviroment without seismic noise. New high precision experimental tools like stable optical clocks and atomic interferometers require a gravity free environment in order to utilze the full potential of precision. We describe the state of the art of such devices and outline a roadmap of their potential use for fundamental physics and technology.

EP 5.3 Di 14:15 Zahnklinik

Cold Atoms in Microgravity and in Space — •Claus Lämmerzahl[1] and Hansjörg Dittus[2] — [1]ZARM, University Bremen, 28359 Bremen — [2]DLR, Institute for Space Systems, 28359 Bremen

A long free evolution time of ultracold atoms enables unprecedented sensitivity of measurements. Long free evolution of quantum systems is only possible in free fall. Therefore microgravity and space are the natural environment to exploit the capabilities of quantum sensors. We outline the range of applications of quantum sensors in space as inertial sensors and as devices for improved fundamental physics tests in the area of gravitational physics and quantum mechanics. We also report on the present state of the technological readiness. As an example we describe the progress made for Bose-Einstein Condensates and atomic interferometry in free fall, both projects carried through at the drop tower in Bremen.