GR 5: Invited Talks 3

Time: Tuesday 11:50–12:30 Location: H 2013

Invited Talk GR 5.1 Tue 11:50 H 2013

Quantum Gravity - General Introduction and Recent Developments — •Claus Kiefer — Institute for Theoretical Physics, University of Cologne, Köln

One of the biggest open problems in physics is the consistent unification of quantum theory with general relativity. The resulting quantum theory of gravity would have an important bearing upon the physics of the early universe, the understanding of black holes, and the structure of spacetime. In my talk, I start by giving a general introduction to the motivation for and the problems of a theory of quantum gravity. I then briefly describe the main approaches - quantum general relativity (including loop quantum gravity) and string theory - and some of their applications. I conclude with presenting some recent results that deal with the possible observation of primordial gravitons, the microstructure of space, black-hole entropy, and quantum cosmology.

Ref.: C. Kiefer, Quantum Gravity (Oxford University Press, third ed. 2012).