

GR 8: Hauptvorträge Donnerstag

Zeit: Donnerstag 8:30–10:30

Raum: A214

Hauptvortrag GR 8.1 Do 8:30 A214
Superstrings and Cosmology — •DIETER LÜST — Max-Planck-Institute for Physics, Föhringer Ring 6, 80805 München und Ludwig-Maximilians-Universität, Arnold-Sommerfeld-Center, Theresienstrasse 37, 80333 München

Abstract: Superstrings as a unified theory of particles and forces contain gauge interactions as well as gravitational interactions. Hence superstrings should also provide some microscopic understanding about the physics of the early universe. In this talk I will discuss several aspects of superstring cosmology:

- (i) String inflation
- (ii) Dark energy from strings
- (iii) The multiverse picture
- (iv) Strings and singularities - physics around the big bang.

Hauptvortrag GR 8.2 Do 9:10 A214
Anti-de Sitter black holes dual to thermal quantum field theories — •JOHANNA ERDMENGER — Max-Planck-Institut für Physik, München

We discuss the duality between classical gravity in an Anti-de Sitter black hole background and quantum field theory at finite temperature. This duality arises from string theory in a particular saddle point approximation. Using this duality, it is possible to calculate observables for strongly coupled plasmas which are similar to the quark-gluon plasma studied at heavy-ion colliders. In particular, it is possible to describe the dynamical behaviour of mesons (quark-antiquark bound states) in the plasma by embedding additional hypersurfaces (D-branes) into the black hole background. A geometrical first-order phase transition appears which is interpreted as meson melting. More-

over, results for meson spectral functions at finite density are presented within this approach. We also comment on the description of non-equilibrium field theory with a collapsing matter shell in Anti-de Sitter space.

Hauptvortrag GR 8.3 Do 9:50 A214
Cosmic and superconducting strings — •BETTI HARTMANN — School of Engineering and Science, Jacobs University Bremen, 28759 Bremen

Cosmic strings are the topological defect that seems most important from the point of view of cosmological applications, especially since it is now believed that cosmic strings might be linked to the fundamental strings of String theory. The reason are so-called brane world scenarios which allow to lower the fundamental Planck scale down to the TeV scale. Newly developed inflation scenarios (e.g. hybrid inflation) almost always predict the production of strings at the end of inflation. The objects formed are so-called D- and F-strings, where D stands for Dirichlet and F for fundamental. Also bound states of these F- and D-strings, so-called p-q-strings are possible. Recently, field theoretical models have been developed that describe such objects. In the first part of my talk, I will discuss the “zoo” of cosmic strings available and also mention their gravitational properties. In the second part of my talk I will concentrate on *superconducting strings*. These are current- and charge-carrying strings, which can have an additional internal structure in the form of bosonic or fermionic fields. This internal structure can lead to the formation of vortons, i.e. loops of cosmic string that are balanced against gravitational collapse by a non-vanishing angular momentum. I will discuss an equation of state describing superconducting strings that has recently been confirmed numerically.