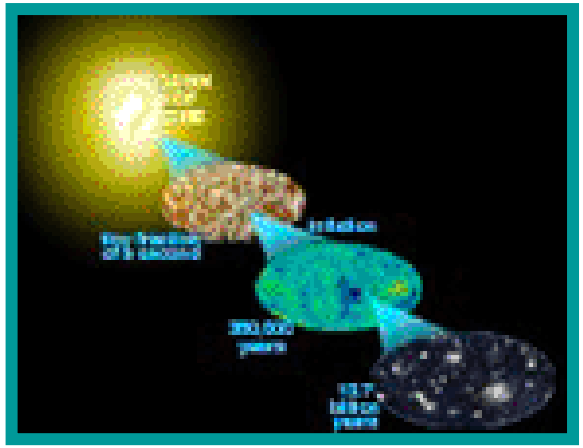
THE NIELS BOHR INSTITUTE

Theoretical Particle Physics and Cosmology Group



The Theoretical Particle Physics and Cosmology group at the Niels Bohr Institute is involved in a wide scope of research activities centered around quantum theories of gauge fields, gravity and astrophysics. Research areas include the Standard Model, Quantum Chromodynamics, Lattice Simulations, Cosmology, Physics of Cosmic Microwave Background, Black Holes, Matrix Theory and String Theory. More specific research interests as well as publications can be found on the individual home pages of the members of the group.

The HET group at NBI, Blegdamsvej (which is part of the NBI) has furthermore close scientific relations with the HET group at Nordita.

Scientific Staff

Name	Position
Ambjørn, Jan	Professor
Damgaard, Poul Henrik	Associate Professor
Di Vecchia, Paolo	Professor
Døssing, Thomas	Associate Professor
Hansen, Steen Harle	Associate Professor
Jackson, Andrew Dumont	Professor
Kristjansen, Charlotte Fløe	Associate Professor
Luther, Alan Harold	Professor
Mishustin, Igor	Adjoint Professor
Mottelson, Ben	Adjoint Professor
Naselsky, Pavel	Associate Professor
Nielsen, Holger Frits Bech	Professor
Obers, Niels	Associate Professor
Olesen, Poul	Professor
Ulfbeck, Ole Carsten	Associate Professor

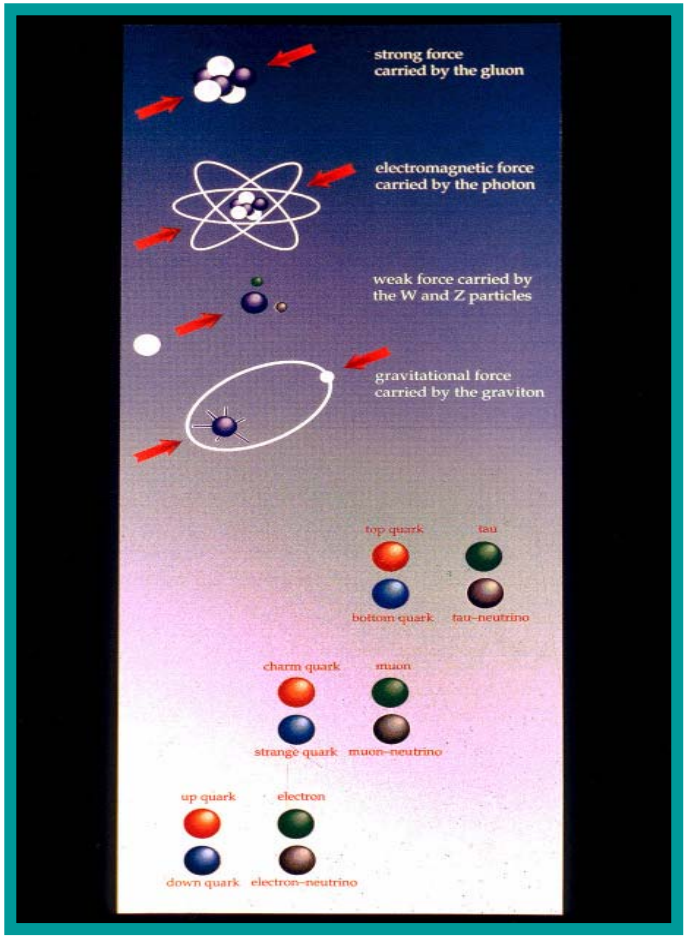
Postdocs, Research Associates and Visitors

Name	Position	Name	Position
Asakawa, Tsuguhiko	Visiting Professor	Matsuura, So	Visiting Professor
Boels, Rutger H.	Post-doc.	Orselli, Marta	Visiting Professor
Casteill, Pierre-Yves Jules	Post-doc.	Splittorff, Kim	Assistant Professor
Grimstrup, Jesper	Post-doc.	Takayama, Yasutoshi	Post-doc.
Harmark, Troels	Associate Professor	Tonni, Erik	Visiting Professor
Hirano, Shinji	Post-doc.		
Kouvaris, Christoforos	Post-doc.		

Ph. D students

Name	Position	Name	Position
Butt, Mohammad Sharaz	Ph.D. student	Larsen, Kasper Risager	Ph.D. student
Frandsen, Mads Toudal	Ph.D. student	Losa, Christina	Ph.D. student
Gesser, Jens Anders	Ph.D. student	Rønne, Peter Browne	Ph.D. student
Jarosz, Andrzej	Ph.D. student	Ryttov, Thomas Aaby	Ph.D. student

RESEARCH



Black Holes, GR….

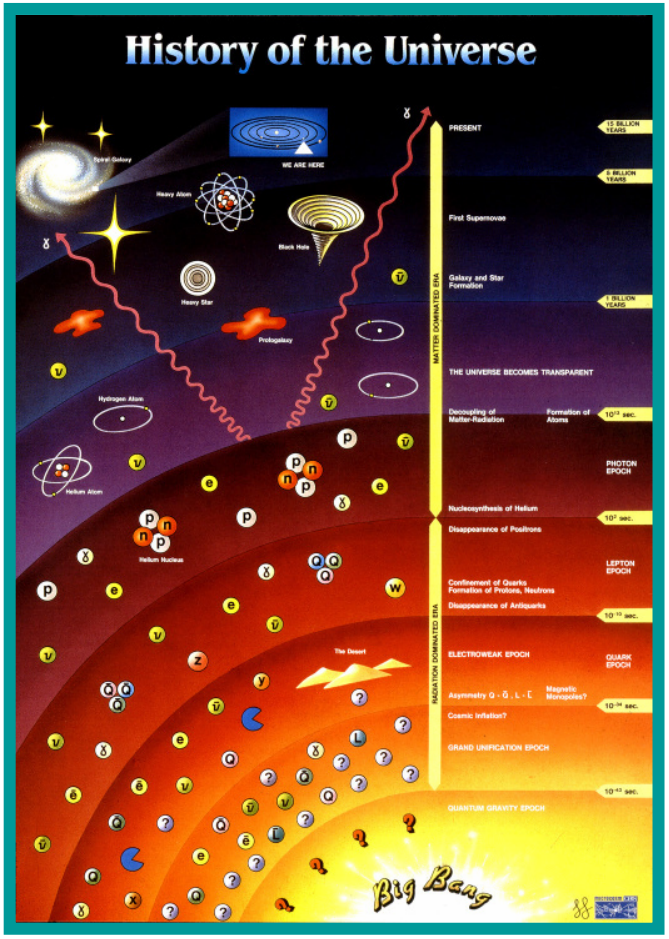
- Study the phase structure of higher-dimensional gravity which is interesting in its own right to explore GR in higher dimensions (large extra dimension scenarios) and it is surprisingly different than four-dimensional gravity, and applications to string theory via the gauge/gravity correspondence, e.g. new phases of thermal SYM theories, microscopic entropy counting.

- Investigate the Thermal phase structure of supersymmetric field theories, matrix models and emergence of space time

List of people working on these subjects

Niels Obers, Troels Harmark, Shinji Hirano, Rutger Boels, Peter Roenne

AdS/CFT correspondence, Finite Temperature gauge and string theories, Integrability

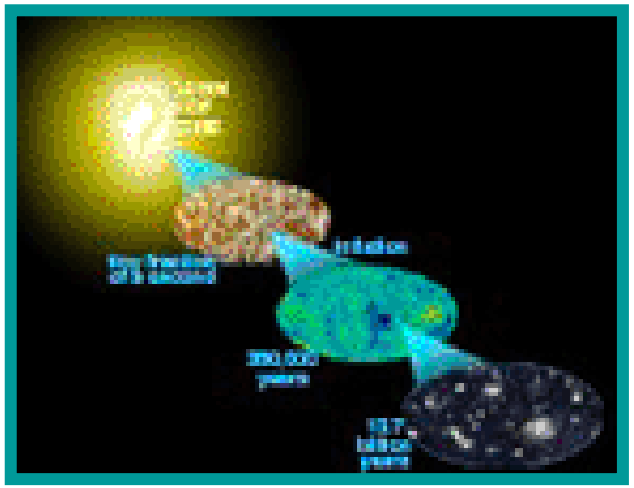


- Investigation of the Hagedorn transition in string theory. Interesting since it means that perturbative string theory should break down above a certain temperature.
- Study of the AdS/CFT correspondence. This is important because it can be use to better understand some of the most challenging problems in theoretical physics such has the confinement/deconfinement phase transition, black holes and the strong coupling behavior of gauge
- Investigation of the integrability of planar N=4 SYM theory and of its string theory dual.

List of people working on these subjects

Niels Obers, Troels Harmark, Marta Orselli, Paolo Di Vecchia, Shinji Hirano, Charlotte Kristjansen, Pierre-Ives Casteill, Shinji Hirano, Yastoshi Takayama, Andrzei Jarosz

Instanton effects and Brane Models



- Study the perturbative and non-perturbative properties of string models based on magnetized wrapped D branes for constructing string extensions of the Standard Model and for studying purely string effects that could be detected in the experiments.

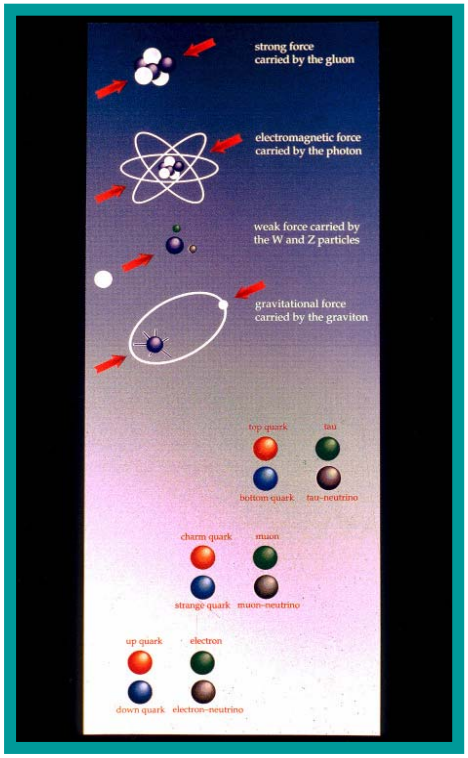
Phenomenology, QCD, Susy gauge theories

- Investigation of Theory and Phenomenology of gauge theories with fermions in higher reps. of the gauge group. In the continuum and on the lattice. They might provide viable candidates for Walking Technicolor models of Electroweak Symmetry Breaking that may be probed at LHC and ILC.
- Study of the microscopic domain of QCD where exact non-perturbative solutions can be obtained using chiral random matrix theory and group integrals of the epsilon-domain chiral perturbation theory. It can teach us about the sign problem in QCD at non-zero baryon chemical potential.

List of people working on these subjects

Paolo Di Vecchia, Poul Henrik Damgaard,Kim Splittorff, Mads Toudal, Thomas Ryttov

Various aspects of Supersymmetric Gauge Theories



- Study of the lattice formulation for supersymmetric gauge theories which is obtained by an orbifold projection of matrix Yang-Mills theories. This construction seems to be quite natural from the point of view of the string theory. It is important in order to develop effective methods to investigate non-perturbative nature of SUSY gauge theory from this kind of lattice formulation.

- Study of the dynamical SUSY breaking in meta-stable vacua from the gauge/gravity duality perspective and its application to the landscape. This is an extremely beautiful/simple/basic field theoretic mechanism, hence very robust and ubiquitous. The gauge/gravity duality suggests its ubiquity also in the gravity/string theory.

- Investigation of exact solutions to factorization of Seiberg-Witten curves. These solutions enable us to understand the global structure of N=1 supersymmetric vacua.

List of people working on this subjects

Niels Obers, Poul Henrik Damgaard, So Matsuura, Kim Splittorff, Shinji Hirano, Yastoshi Takayama, Peter Roenne, Jens Gesser, Kasper Risager