

Virtuelles Institut "Particle Cosmology" (VIPAC)

Sachbericht 2007 (VH-VI-106)

Im vergangenen Jahr waren die Postdoc-Stellen der 4 Arbeitsgruppen wie folgt besetzt:

Dr. Andrea Zanzi (1.1. - 31.3.); Saul Ramos Sanchez (1.1. - 31.12.) (Bonn)

Dr. Riccardo Catena (1.1. - 30.9.); Dr. Florian Bauer (1.10. - 31.12.) (DESY)

Dr. Thomas Dent (1.1. -31.12.) (Universität Heidelberg)

Dr. Grigoris Panotopoulos (1.1. - 31.12.) (LMU Munchen)

Schwerpunkte der wissenschaftlichen Arbeit waren:

- (1) Die Rolle von R-Paritaet, Neutrinoeigenschaften und Supersymmetriebrechung in Kompaktifizierungen der heterotischen Stringtheorie; Neutrinoeigenschaften und Baryogenese; nicht-thermische Leptogenese (Bonn, DESY, Munchen)
- (2) Kosmologische Aspekte von Skalarfeldern: Supersymmetrische Skalar-Tensor-Theorien, Quintessence, der Einfluss zeitabhaengiger Eichkopplungen auf die Nukleosynthese, das Axion-Dilaton-System, dunkle Energie und kosmische Neutrinos, "Neutrino-Sterne". (DESY, Heidelberg)
- (3) Quasi-stabile Gravitinos als Dunkle Materie; Gamma-Strahlung von zerfallender dunkler Materie; Gravitinos in Modellen mit zusaetzlichen Raumdimensionen. (DESY, Munchen)
- (4) Inflation und kosmische Hintergrundstrahlung: Spektrum von Gravitationswellen in k-Inflation; der Einfluss kosmischer Strings; Zusammenhang mit dunkler Materie und dunkler Energie; Alternativen zur Inflation. (Heidelberg, Munchen)

Die Resultate wurden auf einer Reihe internationaler Konferenzen und Workshops vorgestellt, zum Teil durch groessere Uebersichtsvortraege.

Durch wechselseitige Seminarvortraege und laengere Aufenthalte wurde die wissenschaftliche Zusammenarbeit gefoerdert, was auch zu gemeinsamen Publikationen fuehrte.

Herausragende Veranstaltungen waren:

- 1.10. - 5.10. Gemeinsamer Workshop der Sonderforschungsbereiche 676 (Hamburg), TR 33 (Bonn-Heidelberg-Muenchen) und VIPAC im Physikzentrum Bad Honnef und an der Universitaet Bonn.
- 4.12. - 5. 12. Symposium on Particle Cosmology bei DESY
Hauptvortraege von VIPAC und auswaertigen Sprechern (CERN, APC Paris, CITA Toronto) und kuerzere Plenarvortraege zum Stand der einzelnen Projekte.

Hamburg, 15. Mai 2008



(W. Buchmüller)

Anlage: Verzeichnis der Publikationen

List of Publications 2007

VIPAC Postdocs and Principal Investigators

Bonn University

- 1) The Heterotic Road to the MSSM with R parity.
By Oleg Lebedev, et al., Phys.Rev.D77:046013,2008. [arXiv:0708.2691]

- 2) Seesaw neutrinos from the heterotic string.
By Wilfried Buchmuller, Koichi Hamaguchi, Oleg Lebedev, Saul Ramos-Sanchez, Michael Ratz, Phys.Rev.Lett.99:021601,2007. [hep-ph/0703078]

- 3) Mirage Torsion.
By Felix Ploger, Saul Ramos-Sanchez, Michael Ratz, Patrick K.S. Vaudrevange, JHEP 0704:063,2007. [hep-th/0702176]

- 4) Multiple anomalous U(1)s in heterotic blow-ups.
By S. Groot Nibbelink, H.P. Nilles, M. Trapletti, Phys.Lett.B652:124-127,2007. [hep-th/0703211]

- 5) The Gaugino code.
By Kiwoon Choi & Hans Peter Nilles, JHEP 0704:006,2007. [hep-ph/0702146]

DESY

- 6) Constraining the early Hubble rate using cosmic antiprotons.
By Mia Schelke, Riccardo Catena, Nicolao Fornengo, Antonio Masiero, Massimo Pietroni. Nucl.Phys.Proc.Suppl.173:56-59,2007.

- 7) Enlarging mSUGRA parameter space by decreasing pre-BBN Hubble rate in Scalar-Tensor Cosmologies.
By Riccardo Catena, Nicolao Fornengo, Antonio Masiero, Massimo Pietroni, Mia Schelke. [arXiv:0712.3173]

- 8) Axion-dilaton cosmology and dark energy.
By Riccardo Catena & Jan Moller, JCAP 0803:012,2008. [arXiv:0709.1931]

- 9) Cosmological implications of a supersymmetric extension of the Brans-Dicke theory.
By Riccardo Catena.
AIP Conf.Proc.957:371-374,2007. [arXiv:0709.1638]

- 10) Baryogenesis: 40 Years Later.
By Wilfried Buchmuller, [arXiv:0710.5857]
- 11) CP Violation and Neutrino Masses and Mixings from Quark Mass Hierarchies.
By Wilfried Buchmuller, Laura Covi, David Emmanuel-Costa, Soren Wiesenfeldt,
JHEP 0712:030,2007. [arXiv:0709.4650]
- 12) Gamma-Rays from Decaying Dark Matter.
By Gianfranco Bertone, Wilfried Buchmuller, Laura Covi, Alejandro Ibarra,
JCAP 0711:003,2007. [arXiv:0709.2299]
- 13) Local SU(5) Unification from the Heterotic String.
By W. Buchmuller, C. Ludeling, J. Schmidt, JHEP 0709:113,2007. [arXiv:0707.1651]
- 14) Gravitino Dark Matter in R-Parity Breaking Vacua.
By Wilfried Buchmuller, Laura Covi, Koichi Hamaguchi, Alejandro Ibarra, Tsutomu
Yanagida, JHEP 0703:037,2007. [hep-ph/0702184]

Heidelberg University

- 15) Big Bang nucleosynthesis as a probe of varying fundamental 'constants'.
By Thomas Dent, Steffen Stern, Christof Wetterich. AIP Conf.Proc.957:383-386,2007.
- 16) Big Bang nucleosynthesis as a probe of fundamental constants.
By Thomas Dent, Steffen Stern, Christof Wetterich, J.Phys.G35:014005,2008.
[arXiv:0710.4854]
- 17) Primordial nucleosynthesis as a probe of fundamental physics parameters.
By Thomas Dent, Steffen Stern, Christof Wetterich. Phys.Rev.D76:063513,2007.
[arXiv:0705.0696]
- 18) Neutrino Lumps in Quintessence Cosmology.
By N. Brouzakis, N. Tetradis, C. Wetterich. [arXiv:0711.2226]
- 19) Growing neutrinos and cosmological selection.
By C. Wetterich, Phys.Lett.B655:201-208,2007. [arXiv:0706.4427]
- 20) Growing Matter.
By Luca Amendola, Marco Baldi, Christofn Wetterich. [arXiv:0706.3064]

LMU Munich

- 21) Detectable primordial non-gaussianities and gravitational waves in k-inflation.
By Grigoris Panotopoulos. Phys.Rev.D76:127302,2007. [arXiv:0712.1713]

- 22) Non-thermal leptogenesis and gravitino problem in inflaton decay.
By Grigoris Panotopoulos. JHEP0712:016, 2007. [arXiv:0712.1430]
- 23) Statefinder parameters in two dark energy models.
By Grigoris Panotopoulos. Nucl.Phys.B796:66-76,2008. [arXiv:0712.1177]
- 24) Cosmic strings and natural inflation.
By Grigoris Panotopoulos. JHEP 0706:080,2007. [arXiv:0706.2747]
- 25) A Brief note on how to unify dark matter, dark energy, and inflation.
By Grigoris Panotopoulos. Phys.Rev.D75:127301,2007. [arXiv:0706.2237]
- 26) Assisted chaotic inflation in brane-world cosmology.
By Grigoris Panotopoulos. Phys.Rev.D75:107302,2007. [arXiv:0704.3201]
- 27) Gravitino dark matter in brane-world cosmology.
By Grigoris Panotopoulos. JCAP 0705:016,2007. [hep-ph/0701233]
- 28) The New ekpyrotic ghost.
By Renata Kallosh, Jin U. Kang, Andrei Linde, Viatcheslav Mukhanov.
JCAP 0804:018,2008. [arXiv:0712.2040]
- 29) Cosmological perturbations from inflation.
By Viatcheslav F. Mukhanov. J.Phys.A40:6561-6572,2007.
- 30) Cosmic inflation.
By Viatcheslav F. Mukhanov. AIP Conf.Proc.910:40-54,2007.
- 31) Cosmology and the many worlds interpretation of quantum mechanics.
By Viatcheslav Mukhanov.
In *Carr, Bernard (ed.): Universe or multiverse* 267-27.
- 32) k-Essence, superluminal propagation, causality and emergent geometry.
By Eugeny Babichev, Viatcheslav Mukhanov, Alexander Vikman.
JHEP 0802:101,2008. [arXiv:0708.0561]
- 33) Looking beyond the horizon.
By Eugeny Babichev, Viatcheslav Mukhanov, Alexander Vikman.
[arXiv:0704.3301]

24) How robust are the inflationary predictions?

By V.F. Mukhanov.

Prog.Theor.Phys.Suppl.163:220-244,2006.

25) On the new string theory inspired mechanism of generation of cosmological perturbations.

By Nemanja Kaloper, Lev Kofman, Andrei Linde, Viatcheslav Mukhanov.

JCAP 0610:006,2006. [hep-th/0608200]

26) Escaping from the black hole?

By E. Babichev, Viatcheslav F. Mukhanov, A. Vikman.

JHEP 0609:061,2006. [hep-th/0604075]