Physics of Mass

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Edited by

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PREFACE

The 26th Conference on Orbis Scientiae 1997 is the second in this series of high energy physics and cosmology that took place in the month of December instead of the well established tradition where the month of January was the conference date. This change was due to the increased hotel rates in South Florida. Another change in the organization of these conferences is the choice of a core topic to take half of the conference time. The remaining time will be devoted to subjects of direct interest to participants. In the 1997 Orbis Scientiae we chose “Physics of Mass” as the core topic of the conference, which took over five sessions. The remaining five sessions were devoted to those presentations of direct interest to some of the participants.

The Orbis Scientiae 1998 will cover “The Physics of Spin” as a core topic. In anticipation of the ascending importance of gravity research in the 21st century, for the core topics for the Orbis Scientiae 1999 and 2000 we suggest “The Status of An Evolving Cosmological Parameter” and “The Nature of Gravity from Big Bang to Flat Universe”, respectively. These two topics may be expected to lead on to the first conference in the 21st century in which the core topic should be chosen for the Orbis Scientiae 2001 by the participants. We are pleased to invite the conference participants to send us their choices of core topics.

The Trustees and the Chairman of the Global Foundation, Inc., wish to extend special thanks to Edward Bacinich of Alpha Omega Research Foundation for his continuing generous support including the 1997 Orbis Scientiae.

*Behram N. Kursunoglu
Stephan L. Mintz
Arnold Perlmutter
Coral Gables, Florida
April 1998*

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ORBIS SCIENTIAE 1997 - II PROGRAM

FRIDAY, December 12, 1997

8:00 AM - Noon REGISTRATION

1:30 PM	SESSION I:	GRAVITATIONAL MASS
	Moderators:	BEHRAM N. KURSUNOGLU , Global Foundation, Inc., Coral Gables, Florida
	Dissertators:	BEHRAM N. KURSUNOGLU “Origin of Mass” SYDNEY MESHKOV , CALTECH “Current Status of LIGO” CHRIS POPE , Texas A & M, College Station, Texas “Gauge Dyonic Strings in Six Dimensions”
	Annotators:	JANNA LEVIN , University of California, Berkeley
	Session Organizer:	BEHRAM N. KURSUNOGLU

3:15 PM **COFFEE BREAK**

3:30 PM

SESSION II:	NEUTRINO MASSES
Moderator:	PETER ROSEN , Department of Energy, Washington DC GEOFFREY MILLS , Los Alamos National Laboratory
Dissertators:	JONNY KLEINFELLER , Forschungszentrum Karlsruhe “KARMEN-Upgrade: Improvement In The Search For Neutrino Oscillations And First Results” GEOFFREY MILLS “Results from the LSND Experiment” SANJIB MISHRA , Harvard University “Results from the NOMAD Experiment” CHARLES LANE , Drexel University, Philadelphia, Pennsylvania “First Results from the CHOOZ Experiment” LAWRENCE WAI , University of Washington, Seattle “Atmospheric Neutrino Flux Measurements with the Super-Kamiokande Neutrino Observatory”
Annotators:	STEPHAN MINTZ , Florida International University
Session Organizer:	GEOFF MILLS

6:00 PM - ***Welcoming Cocktails, Fontainebleau Cabana Area***

7:00 PM *Courtesy of Maria and Edward Bacinich*

7:00 PM Orbis Scientiae Adjourns For The Day

SATURDAY, December 13, 1997

8:30 AM	SESSION III:	PROGRESS ON NEW AND OLD IDEAS - I
	Moderators:	PAUL FRAMPTON , University of North Carolina at Chapel Hill
	Dissertators:	PAUL FRAMPTON "Leptoquarks" SHELDON GLASHOW , Harvard University "Tests of Lorentz Invariance" O.W. GREENBERG , University of Maryland "Spin-Statistics, Spin-Locality and TCP: Three Distinct Theorems" GERALD GURALNIK , Brown University "Numerical Field Theory on the Continuum" ALAN KOSTELECKY , Indiana University "Testing CPT Symmetry"
	Annotators:	SYDNEY MESHKOV , CALTECH
	Session Organizer:	PAUL FRAMPTON
10:30 AM	COFFEE BREAK	
10:45 AM	SESSION IV:	PARTICLE MASSES
	Moderators:	SYDNEY MESHKOV HARALD FRITZSCH , Universität München
	Dissertators:	HARALD FRITZSCH "Quark Masses and the Description and Dynamics of Flavor Mixing" RAJAN GUPTA , Los Alamos National Laboratory "Quark Masses From Lattice and Sum Rules & Implications for Epsilon/Epsilon" KENNETH LANE , Boston University "Recent Development in Technicolor" RICH PARTRIDGE , Brown University "Top Mass Measurement" "Leptoquark Search" "Direct and Indirect Measurements of the Higgs Mass at the Tevatron (Present and Future)" S.G. RAJEEV , University of Rochester, New York "Matrix Models of Particle Masses"
	Annotators:	RICHARD P. WOODARD , University of Florida
	Session Organizer:	SYDNEY MESHKOV
12:45 PM	Orbis Scientiae Adjourns for the Day	
7:30 PM	- Conference Banquet - Fontainebleau Ballroom A	
10:30 PM	Courtesy of Maria and Edward Bacinich	

SUNDAY, December 14, 1997

8:30 AM	SESSION V:	COSMOLOGICAL MASSES (BLACK HOLES, NEUTRON STARS, ETC.)
	Moderators:	EDWARD KOLB , FERMI Laboratory, Chicago KATHERINE FREESE , University of Michigan
	Dissertators:	SCOTT DODELSON , FERMI Laboratory “The CMB and Cosmological Parameters” KATHERINE FREESE “Massive Astrophysical Compact Halo Objects” EDWARD KOLB “Who is the Inflation?” VIGDOR L. TEPLITZ , Southern Methodist University “Mass of the Kuiper Belt” EDWIN TURNER , Princeton University “Gravitational Lens Determinations of the Mass and Age of the Universe”
	Annotators:	FRANCESCO ANTONUCCIO , The Ohio State University
	Session Organizer:	EDWARD KOLB , FERMI Laboratory, Chicago
10:30 AM	COFFEE BREAK	
10:45 AM	SESSION VI:	PROGRESS ON NEW AND OLD IDEAS - II
	Moderator:	GEOFFREY WEST , LANL
	Dissertators:	ROBERT BLUHM , Colby College “Testing CPT in Atomic Physics” GERALD B. CLEAVER , University of Pennsylvania “Mass Hierarchy and Flat Directions in String Models” ZACHARY GURALNIK , Princeton University “Branes, Torons, and Yang-Mills Dualities” PAOLO PRIVITERA , University of Rome, Italy “Measurement of the Mass of the Intermediate Vector Bosons” RICHARD P. WOODARD “Particles As Bound States In Their Own Potential”
	Annotators:	KATSUMI TANAKA , Ohio State University
	Session Organizer:	STEPHAN MINTZ
12:45 PM	LUNCH BREAK	
1:30 PM	SESSION VII:	SUSY MASSES
	Moderators:	RICHARD ARNOWITT , Texas A&M University
	Dissertators:	RICHARD ARNOWITT “Non-Universal Soft SUSY Breaking” STEPHANE FICHET , LPNHE, Paris France “Status of Higgses and SUSY Mass Limits at LEP” CHUNG KAO , University of Wisconsin “Infrared Fixed Point Results in mSUGRA Models” STEPHAN MINTZ “Observing the Weak Interaction in Polarized Parity Violating Electron Scattering”

SUNDAY, December 14, 1997

JAMES WHITE, Texas A&M University
“Supersymmetry at the Tevatron - Current Limits and Future Prospects”

Annotators: **RICH PARTRIDGE**

Session Organizer: **VERNON BARGER**, University of Wisconsin - Madison

3:30 PM **COFFEE BREAK**

3:45 PM **SESSION VIII: PROGRESS ON NEW AND OLD IDEAS - III**

Moderators: **LOUISE DOLAN**, University of North Carolina at Chapel Hill
KATSUMI TANAKA

Dissertators: **LOUISE DOLAN**
“The Tube Metric Conformal Field Theory as a String Vacuum”
PRAN NATH, Northeastern University, Boston, Massachusetts
“Nucleon Stability and Dark Matter Constraints on SUSY Unification”
KELLY STELLE, Imperial College, London
“Charge Quantization and P-Brane Spectra”
KATSUMI TANAKA, Ohio State University
“Quark Masses in Dual Theories”

Annotators: **STEPHANE FICHET**

Session Organizer: **LOUISE DOLAN**

5:30 PM Conference Adjourns for the Day

MONDAY, December 15, 1997

8:30 AM **SESSION IX: PROGRESS ON NEW AND OLD IDEAS - IV**

Moderators: **STEPHEN PINSKY**, Ohio State University
FRED ZACHARIASEN, CALTECH

Dissertators: **FRANCESCO ANTONUCCIO**
“DLCQ of Supersymmetric Matrix Models”
BRIAN MEADOWS, University of Cincinnati
“BaBar Experiment at SLAC”
TERRY WALKER, Ohio State University
“Primordial Lithium and the Baryonic Mass of the Universe”

Annotators: **ARNOLD PERLMUTTER**, University of Miami

Session Organizer: **STEPHEN PINSKY**, Ohio State University

10:15 AM **COFFEE BREAK**

10:30 AM **SESSION X: BIG BANG CREATION OF MASS**

Moderators: **EDWARD KOLB**

Dissertators: **JOSH FRIEMAN**, FERMI Laboratory
“The Distribution of Mass in the Universe”
CHRIS HILL, FERMI Laboratory
“A Brief History of Mass”
PIERRE RAMOND
“The Issue of Mass”

Annotators: **BEHRAM KURSUNOGLU**

Session Organizer: **EDWARD KOLB**

12:30 PM ORBIS SCIENTIAE 1997 - II ADJOURNS

CONTENTS

SECTION I
Gravitational Mass

A New Cosmological Parameter Spanning the Microcosm and Macrocosm 3
Behram N. Kursunoglu

Top Quark and Electroweak Mass 9
Christopher T. Hill

Anti-de Sitter Black Holes and Their Superpartners in 2 + 1 Dimensions 19
Sharmanthie Fernando and Freydoon Mansouri

The Case for a Standard Model with Anomalous $U(1)$ 31
Pierre Ramond

p -Form Charges and p -Brane Spectra 45
K. S. Stelle

SECTION II
Neutrino Masses

KARMEN—Upgrade: Improvement in the Search for Neutrino Oscillations and
First Results 57
J. Kleinfeller et al.

Atmosphere Neutrino Flux Studies with the Super-Kamiokande Detector 61
Lawrence Wai

Numerical Field Theory on the Continuum 65
Stephen Hahn and G. S. Guralnik

SECTION III
Progress on New and Old Ideas

Leptoquarks Revisited 75
Paul H. Frampton

The Relation of Spin, Statistics, Locality and TCP 81
O. W. Greenberg

Testing a CPT-and Lorentz-Violating Extension of the Standard Model	89
V. Alan Kostelecký	
Tests of CPT and Lorentz Symmetry in Penning-Trap Experiments	95
Robert Bluhm, V. Alan Kostelecký, and Neil Russell	
Mass Hierarchy and Flat Directions in Sting Models	101
Gerald B. Cleaver	
Measurement of the Mass of the Intermediate Vector Bosons at LEP	111
Paolo Privitera	
Polarized Parity Violating Electron Scattering on ^3He from Low to High Energy	125
S. L. Mintz, G. M. Gerstner, and M. A. Barnett	
Guage Dyonic Strings and Their Global Limit	141
M. J. Duff, James T. Liu, H. Lü, and C. N. Pope	

SECTION IV Particle Masses

Quark Mass Hierarchy and Flavor Mixing	165
Harold Fritzsch	
Quark Masses, B-Parameters, and CP Violation Parameters ϵ and ϵ'/ϵ	177
Rajan Gupta	

SECTION V Progress on New and Old Ideas II

Particles as Bound States in Their Own Potentials	197
R. P. Woodard	
Enhanced Symmetries and Tensor Theories in Six Dimensions	211
L. Dolan	
Quark Masses in Dual Theories	221
K. Tanaka	
The Ba- $\bar{\text{B}}$ Experiment at SLAC	227
B. T. Meadows	
On the Mass of the Kiper Belt	237
V. L. Teplitz, D. C. Rosenbaum, R. J. Scalise, S. A. Stern, and J. D. Anderson	
Nucleon Stability and Dark Matter Constraints on SUSY Unification	251
Pran Nath and R. Arnowitt	
Large N Duality of Yang-Mills Theory on a Torus	261
Zachary Guralnik	
SUSY Masses with Non-Universal Soft Breaking	273
R. Arnowitt and Pran Nath	
Index	281