

Final Report on DOE Grant DE-SC0001075
titled
“Supersymmetry and Unification of Fundamental
Interactions-SUSY2009

Final report for period: 06/2009- 05/2010

Principal Investigator: Nath, Pran

Organization: Northeastern University

Submitted By: Nath, Pran - Principal Investigator

Title: Supersymmetry and Unification of Fundamental Interactions-SUSY2009

Project participants

Senior Personnel

Name: Nath, Pran

Other Participants: Nearly 350 conference participants including senior faculty, junior faculty, post docs, and graduate students.

Activities and Findings

SUSY2009 brought together researchers from a very broad area of fundamental physics including elementary particle theory, astrophysics and cosmology and string theory with a focus on supersymmetry. Thus the topic covered at the SUSY2009 conference included the following:

Search for the Higgs boson, search for supersymmetry, supersymmetry phenomenology, theories of dark matter and direct and indirect detection, neutrino physics, accelerator experiments, electroweak physics, supersymmetry phenomenology, string theory, string phenomenology, extra Dimensions as well as other recent theoretical and experimental developments. The conference was successful in fostering interdisciplinary interactions between theorists and experimentalists.

Training and Development

The project provided training for many graduate student who participated in the conference to learn how science is done by listening to leading experts in several front line areas of particle physics.

Outreach Activities

A public lecture by Nobel Laureate Frank Wilczek was arranged which was geared to a broad audience to make the public aware of the progress occurring in the field of fundamental science in this area.

Publications

“Supersymmetry and the unification of fundamental interactions. Proceedings, 17th International Conference, SUSY09, Boston, USA, June 5-10, 2009,” edited by P. Nath, (ed.), G. Alverson, (ed.) and B. Nelson, (ed.), C09-06-05 (AIP Conf. Proc. 1200 (2009) 1159 p). The AIP publication includes the latest developments on the topics discussed above which include the Higgs boson, search for supersymmetry, supersymmetry phenomenology, theories of dark matter and direct and indirect detection, neutrino physics, accelerator experiments, electroweak physics, supersymmetry phenomenology, string theory, string phenomenology, and extra Dimensions. Both theoretical and experimental talks were included.

Conference Agenda

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List of Attendees



SUSY09: 5-10 June
BSM-LHC: 2-4 June

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SUSY '09 Plenary Schedule

Friday

Session 1 (Friday June 5, 8:30 AM)

Chair: Pran Nath

Registration

Welcome

Jenni *LHC Entering Operation: an Overview of the LHC Program*
 D'Onofrio *Experimental searches for SUSY at the Tevatron*

Coffee Break (Friday June 5, 10:45 AM)

Session 2 (Friday June 5, 11:15 AM)

Chair: George Alverson

Büscher *Experimental Searches for Higgs Bosons at the Tevatron*
 Baer *Leptonic SUSY signatures at the LHC*

Lunch (Friday June 5, 12:45 PM)

Session 3 (Friday June 5, 2:15 PM)

Chair: Haim Goldberg

Dreiner *How light can the lightest Neutralino be?*
 Antoniadis *Anomaly driven physics of extra U(1)'s*
 Sundrum *Dark Masses and SUSY Breaking*

Coffee Break (Friday June 5, 3:45 PM)

Session 4 (Friday June 5, 4:10 PM)

Chair: Michael Vaughn

Cvetic *D-Instantons and Particle Physics Implications*
 Raby *String Model Building*
 de Boer *Indirect Dark Matter Signatures in the light of FERMI, EGRET and PAMELA*

Reception (Friday June 5, 6:30 PM)

Monday

Session 5 (Monday June 8, 9:00 AM)

Chair: Howard Haber

David *CMS: from commissioning to first beams*
 Jinnouchi *Searches for SUSY with the ATLAS detector*
 Mohapatra *Neutrino Mass Physics and Origin of Matter at LHC*

Coffee Break (Monday June 8, 10:30 AM)

Session 6 (Monday June 8, 11:00 AM)

Chair: Pran Nath

Gaillard *T-duality and the weakly coupled heterotic string*
 Randall *Flavor Physics from Extra Dimensions*
 Nilles *From the heterotic string to the MSSM*

Lunch (Monday June 8, 12:30 PM)

Session 7 (Monday June 8, 2:00 PM)

Chair: Michael Vaughn

Profumo	<i>Fundamental Physics from the Sky</i>
Pilaftsis	<i>CP Violation in Supersymmetry</i>
Tata	<i>Supersymmetry, Dark Matter and the LHC</i>

Coffee Break (Monday June 8, 3:30 PM)

Session 8 (Monday June 8, 4:00 PM)

Chair: Tomasz Taylor

Zumino	<i>Star Product for exterior differential forms with application to superstring theory</i>
Dixon	<i>Multi-Loop Finiteness of $N=8$ Supergravity</i>

Banquet (Monday June 8, 6:30 PM)

Tuesday

Session 9 (Tuesday June 9, 8:30 AM)

Chair: Apostolos Pilaftsis

Klein	<i>Neutrinos from Fermilab, the Sky, the Earth, the Sun and the Stars, to Homestake</i>
de Sangro	<i>New Physics Searches at the B-Factories</i>
Kinoshita	<i>New Physics Searches at the B-Factories II: Examining the Loops</i>
Masiero	<i>CPV and Flavor in SUSY: Frustration and Hope</i>

Coffee Break (Tuesday June 9, 10:30 AM)

Session 10 (Tuesday June 9, 11:00 AM)

Chair: Herbi Dreiner

Zerwas	<i>Extracting the fundamental parameters</i>
Langacker	<i>The Physics of New $U(1)'$ Gauge Bosons</i>
Babu	<i>Recent Progress in SUSY GUTs</i>

Lunch (Tuesday June 9, 12:30 PM)

Session 11 (Tuesday June 9, 2:00 PM)

Chair: Brent Nelson

Kane	<i>Non-thermal wino LSP dark matter describes Pamela data well!</i>
Wagner	<i>The Supersymmetric Origin of Matter</i>
Buchmuller	<i>Gravitino Dark Matter</i>

Coffee Break (Tuesday June 9, 3:30 PM)

Session 12 (Tuesday June 9, 4:00 PM)

Chair: Dieter Lust

Shifman	<i>Non-Abelian Strings: From Weak to Strong Coupling and Back via Duality</i>
Trivedi	<i>Non-Supersymmetric Stable Throats in Flux Compactifications</i>
Valle	<i>Neutrino mass in supersymmetry: Theory and implications</i>

Wednesday

Session 13 (Wednesday June 10, 9:00 AM)

Chair: Rabindra Mohapatra

Nandi	<i>Fermion Mass Hierarchy and New Physics at the TeV Scale</i>
King	<i>Neutrino Mass and Flavour Models</i>
Kim	<i>Current status of axion physics</i>

Coffee Break (Wednesday June 10, 10:30 AM)

Session 15 (Wednesday June 10, 2:00 PM)

Chair: Hans Peter Nilles

Senjanovic

Proton Decay and Grand Unification

Dienes

New Non-Trivial Vacuum Structures in Supersymmetric Field Theories

Lüst

Strings at the LHC

[†]Professor Vafa's non-appearance was unintentional and resulted from a miscommunication with the Organizing Committee



SUSY09: 5-10 June

BSM-LHC: 2-4 June

Registration
Abstract Submittal
On-campus Lodging
Off-campus Lodging
Proceedings
Attendees

A List of SUSY09/BSM-LHC Attendees

Amir D. Aczel	Boston University
Claire	LAL
Adam-Bourdarios	University of Iowa
Elif Asli Albayrak	CERN
Martin Aleksa	Harvard
Tavanfar Alireza	University of New Mexico
Rouzbeh Allahverdi	Technische Universitaet Muenchen
Wolfgang	Northeastern University
Altmannshofer	Northeastern University
Baris Altunkaynak	SLAC
George Alverson	UWM
Johan Alwall	INFN - Laboratori Nazionali di Frascati
Luis Anchordoqui	CERN - TH
Alberto Annovi	CEA - IRFU
Ignatios Antoniadis	Laboratoire d'Annecy-le-Vieux de Physique des Particules (LAPP)
Eric Armengaud	Technische Universitat Dresden
Olivier Arnaez	Oklahoma State University
Peter Athron	University of Oklahoma
Kaladi Babu	Fermilab
Howard Baer	University of Toronto/ATLAS
Yang Bai	Yale University
Travis Bain	Monash University
Oliver Baker	Harish-Chandra Research Institute
Csaba Balazs	University Of Victoria, Canada
Priyotosh	CPPM
Bandyopadhyay	Institut fuer Theoretische Physik E
Swagato Banerjee	University of Oxford
Anne-Fleur Barfuss	University of Delaware
Nans Baro	University of Sussex
Alan Barr	NCTS
Stephen Barr	University College London (UCL)
Anders Basbøll	Royal Holloway, University of London
Rachid Benbrik	CEA-Saclay Irfu/SPP
Catrin Bernius	Rutgers University
Tracey Berry	Rockefeller University
Marc Besancon	Universita' degli Studi and INFN Milano
Aatish Bhatia	University of Bern ITP
Anwar Bhatti	CC-IN2P3
Pietro Biassoni	University of Maryland
Simone Bifani	University of Toronto
Catherine Biscarat	Cornell
Steve Blanchet	University of Bonn
Andrew Blechman	University of New Mexico
Freya Blekman	National Taiwan University
Nicki Bornhauser	University of Oklahoma
Sascha Bornhauser	Freiburg University
Francesca Borzumati	
Andrew Box	
Felix Braam	

Xuebing Bu	University of Science and Technology of China
Wilfried Buchmuller	DESY
Matthew Buican	Princeton University
Volker Büscher	Mainz University
Marco Cardaci	Universiteit Antwerp
Marcela Carena	FERMILAB/ U. Chicago
Linda Carpenter	UC Santa Cruz
Elizabeth Castaneda-Miranda	University of Wisconsin-Madison
Pierluigi Catastini	INFN Pisa / Siena University
Richard Cavanaugh	Fermilab / University of Illinois at Chicago
David G. Cerdeno	Universidad Autonoma de Madrid
Riccardo Cerulli	INFN-LNGS
Zackaria Chacko	University of Maryland, College Park
Hamad Chaudhry	KTH
Jie Chen	Florida State University
Mu-Chun Chen	UC Irvine
Ning Chen	Stony Brook
Kiwoon Choi	KAIST
Ilias Cholis	New York University
Eung Jin Chun	Korea Institute for Advanced Study
Daniel Chung	University of Wisconsin - Madison
Diego Julio Cirilo Lombardo	BLTP (JINR-Dubna/Russia)
Louis Clavelli	University of Alabama
John Conley	SLAC
Cristobal Cuenca Almenar	UC Irvine
Javier Cuevas	University of Oviedo
Yanou Cui	Harvard University
Ray Culbertson	Fermilab
Mirjam Cvetič	University of Pennsylvania
Mariarosaria D'Alfonso	UCSB
Monica D'Onofrio	Institut de Fisica d'Altes Energies (IFAE) - Barcelona
De-Chang Dai	SUNY at Buffalo
Asesh K Datta	HRI, Allahabad
Andre David	LIP, Lisbon
Hooman Davoudiasl	Brookhaven National Laboratory
Senarath de Alwis	University of Colorado
Wim de Boer	IEKP
Paul de Jong	Nikhef
Ivo de Medeiros Varzielas	CFTP, IST
Guglielmo De Nardo	Univ. of Napoli and INFN
Riccardo de Sangro	INFN - LNF
Andrea De Simone	MIT
Pierre-Philippe Dechant	Cambridge University
Frank Deppisch	University of Manchester
Cristinel Diaconu	CPPM/DESY
Lorenzo Diaz-Cruz	FCFM-BUAP
Keith Dienes	University of Arizona
Janet Dietrich	Physikalisches Institut, University of Freiburg
John Dixon	Dixon Law Firm
Lance Dixon	SLAC
Alexandru Florin Dobrin	Lund University
Mikhail Dolgoplov	Samara State University, Dept. of Gen. and Theor. Physics

Aaron Dominguez	University of Nebraska -- Lincoln
Mauro Donega	University of Pennsylvania
Ilja Dorsner	Institute Jozef Stefan
Herbi Dreiner	Bonn University
Bhaskar Dutta	Texas A&M University
Hajar Ebrahim	Brandeis University
Ulrich Ellwanger	Lab. de Physique Theorique
Carlos Escobar	UNICAMP
Rouven Essig	SLAC
Adam Everett	Purdue University
Lisa Everett	University of Wisconsin, Madison
Marcello Fanti	Universita` degli Studi di Milano and INFN
Daniel Feldman	Northeastern University
WanZhe FENG	Northeastern Univ
Alexey Ferapontov	Brown University
Enectali Figueroa-Feliciano	Massachusetts Institute of Technology
Pavel Fileviez Perez	University of Wisconsin-Madison
Simon Fiorucci	Brown University
Thomas Flacke	University of Michigan
Henning Flaecher	CERN
Luis Roberto Flores Castillo	University of Wisconsin
Alison Fowler	Institute of Particle Physics Phenomenology
Paul Frampton	University of North Carolina
Sebastian Frank	Institute of High Energy Physics (HEPHY), Vienna
Ayres Freitas	University of Pittsburgh
Sky French	University of Cambridge
James Frost	University of Cambridge
Mary K Gaillard	UC Berkeley/LBNL
James Gainer	SLAC
Diego Gallego	SISSA/ISAS
Jason Gallicchio	Harvard
Robert Garisto	PRL & BNL
Cecilia Garraffo	IAFE (Instituto de Astronomia y Fisica del Espacio)
Jan Germer	MPI für Physik München
Marco Gersabeck	University of Glasgow
Yuri Gershtein	Rutgers
Tony Gherghetta	University of Melbourne
Joel Giedt	RPI
Elena Ginina	HEPHY, Vienna
Franco Giuliani	University of New Mexico
Vladimir Gligorov	University of Glasgow
Ilia Gogoladze	University of Delaware
Michael Gold	University of New Mexico
Haim Goldberg	Northeastern University
Mario E Gomez	Universida de Huelva
Melina Gomez	Instituto de Fisica, UNAM
Max Goncharov	MIT
Shrihari Gopalakrishna	Brookhaven National Lab
Stefania Gori	Technische Universitaet Muenchen
Sebastian Grab	Bonn University
Michael Graesser	LANL
Peter Graham	Stanford
Eilam Gross	Weizmann
Yuval Grossman	Cornell
John Gunion	U.C. Davis
Sudhir Gupta	Iowa State University

Howard Haber	University of California, Santa Cruz
Haleh Hadavand	Southern Methodist University
Tao Han	Univ. of Wisconsin
Zhenyu Han	UC Davis
Koji Hara	Nagoya University
Sam Harper	Rutherford Appleton Laboratory (STFC), UK
Helen Hayward	University of Liverpool
Sven Heinemeyer	IFCA (CSIC)
Johannes Heinonen	Cornell University
Jaime Hernández-Sánchez	FCE-BUAP
Maria Herrero	Universidad Autonoma de Madrid
Keisho Hidaka	Tokyo Gakugei University
Michael Holmes	Northeastern
Tuomas Honkavaara	Helsinki Institute of Physics
Claus Horn	SLAC
Sabine Hossenfelder	Perimeter Institute
Richard Howl	University of Southampton
Raghavendra Hundi	University of Hawaii
HyoJung Hyun	Kyungpook National University
John Idarraga	York University
Ahmad Idilbi	Duke University
Kyoko Iizuka	Seikei Univ.
Amon Ilakovac	University of Zagreb, Faculty of Science
Antonella Incicchitti	INFN sezione di Roma
Tadaaki Isobe	University of Tokyo
Cigdem Issever	University of Oxford
Andrew Ivanov	UC Davis
Shabnam Jabeen	Boston University
Peter Jenni	CERN
Osamu Jinnouchi	KEK
Chad Johnson	Columbia University
Dong-Won Jung	National Central University
Dilani Kahawala	Harvard University
Teruki Kamon	Texas A&M University
Gordon Kane	University of Michigan
Georgia Karapostoli	Imperial College London
Alex Kastanas	University of Bergen
Yevgeny Kats	Harvard University
Panagiotis Katsaroumpas	Queen Mary, University of London
Andrey Katz	University of Maryland
Gregory Keefer	The University of Alabama
Joern Kersten	University of Hamburg
Clemens Kießig	MPI of physics, Munich
Tatsuru Kikuchi	KEK
Jennifer Kile	BNL
Chul Kim	Duke University
Hyung Do Kim	Seoul National University
Ian-Woo Kim	University of Wisconsin-Madison
Jihn E. Kim	Seoul National University
Yeong Gyun Kim	KAIST
Steve King	University of Southampton
Kay Kinoshita	University of Cincinnati
Joshua Klein	University of Pennsylvania
Ameya Kolarkar	Boston University
Yury Kolomensky	LBNL
Tadashi Kon	Seikei Univ.
Otto Kong	National Central University

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Philipp Kostka	Max-Planck-Institut
Dmytro Kovalskyi	UCSB
Karol Kovarik	LPSC Grenoble
James Kraus	Michigan State University
Graham Kribs	University of Oregon
David Krohn	Princeton University
Jason Kumar	University of Hawaii
Piyush Kumar	University of California
Masafumi Kurachi	LANL
Florent Lacroix	UIC
Caleb Lampen	The University of Arizona
Greg Landsberg	Brown University
Paul Langacker	Institute for Advanced Study
Ulrich Langenfeld	DESY Zeuthen
David Larson	Johns Hopkins University
Tomas Lastovicka	University of Oxford
Alfio Lazzaro	Università di Milano
Cristina Lazzeroni	University of Birmingham
Fabienne Ledroit- Guillon	LPSC
Hye-Sung Lee	UC Riverside
Federica Legger	Max Planck Institute
Liang Li	UC Riverside
Syue-Wei Li	National Central University
Yingchuan Li	University of Wisconsin, Madison
Roman Linares	Universidad Autonoma Metropolitana Iztapalapa
Mariangela Lisanti	Stanford University
Tao Liu	University of Chicago
Zuowei Liu	Stony Brook University
Magda Lola	Dept. of Physics, Un. Patras
Owen Long	U. C. Riverside & SLAC
David Lopes Pegna	Princeton University
David Lopez Mateos	California Institute of Technology/Columbia University
Sotiris Loucatos	IRFU,CEA-Saclay
Ian Low	Argonne/Northwestern
Dieter Lüst	LMU-Muenchen
Rasmus Mackeprang	CERN
Dennis Mackin	Rice University/Dzero
Nobuhiro Maekawa	Nagoya University
Carsten Magass	RWTH Aachen University
K.T. Mahanthappa	University of Colorado at Boulder
Rakhi Mahbubani	Fermilab
Prolay Mal	The University of Arizona
Giovanni Marchiori	LPNHE, Paris
Danny Marfatia	University of Kansas
Nancy Marinelli	Univ. of Notre Dame
Christopher Marino	Indiana University
Anja Marold	PI, Uni Bonn
Stephen Martin	Northern Illinois University
Antonio Masiero	Univ. of Padova and INFN, Padova
John Mason	Harvard University
Anupam Mazumdar	Lancaster
Anibal Medina	UC Davis
Bernhard Meirose	Freiburg University
Isabell-A. Meizer- Pellmann	DESY

Arjun Menon	University of Michigan
Paolo Meridiani	CERN
Luca Merlo	University of Padua & INFN Padua
Philippe Mermod	Stockholm University
Arnd Meyer	RWTH Aachen
Octavian Micu	TU Dortmund
David Miller	University of Glasgow
David Milstead	Stockholm University
Yukihiro Mimura	University of Maryland
Shulamit Moed	Harvard University
Rabindra Mohapatra	University of Maryland
Myriam Mondragon	Inst. de Fisica, UNAM
David Morrissey	Harvard University
Moshe Moshe	Technion - Israel Institute of Technology
Biswarup Mukhopadhyaya	Harish-Chandra Research Institute
Shoaib Munir	Insituto de Fisica, Universidad Nacional Autonoma de Mexico
Carlos Munoz	Universidad Autonoma de Madrid & IFT
William Murray	RAL
Azar Mustafayev	University of Kansas
Keiko Nagao	Nagoya University
Eita Nakamura	University of Tokyo
Satyanarayan Nandi	Oklahoma State University
Pran Nath	Northeastern University
Brent Nelson	Northeastern University
Roman Nevzorov	University of Glasgow
Kaixuan Ni	Shanghai Jiao Tong University
Hans Peter Nilles	Univ. Bonn
Carlos Nunez	Swansea University
Ben O'Leary	RWTH Aachen University
Takemichi Okui	Johns Hopkins Univ & Univ of Maryland, College Park
Ali Ovgun	Izmir Institute of Technology
Nurcan Ozturk	University of Texas at Arlington
Katarina Pajchel	University of Oslo
Sean Paling	Sheffield University
Sophy Palmer	Institute for Particle Physics Phenomenology, Durham University
Grigoris Panotopoulos	LMU Munich
Seong Chan Park	IPMU, University of Tokyo
Thomas Paul	Northeastern University
Gil Paz	Institute for Advanced Study, Princeton
Maxim Perelstein	Cornell University
Kala Perkins	UCSB
Piergiorgio Picozza	INFN and University of Rome Tor Vergata
Aaron Pierce	University of Michigan
Maurizio Pierini	CERN
Apostolos Pilaftsis	University of Manchester
David Poland	Harvard University
Giacomo Polesello	INFN Sezione di Pavia
Eduardo Pontón	Columbia University
Werner Porod	Univ. Wurzburg
Xavier Portell	Albert-Ludwigs-Universitaet Freiburg
Stefano Profumo	UC Santa Cruz
Ivica Puljak	University of Split (FESB)
Stuart Raby	The Ohio State University
Arvind Rajaraman	University of California, Irvine
Surjeet Rajendran	SLAC
Lisa Randall	Harvard

Kumar Rao	Helsinki Institute of Physics
Salvatore Rappoccio	Johns Hopkins University
Fedor Ratnikov	KIT, Karlsruhe
Ronald Remington	University of Florida
Leonidas Resvanis	NESTOR Institute
Juergen Reuter	University of Freiburg
Marco Ricci	Istituto Nazionale di Fisica Nucleare
Adam Ritz	University of Victoria
Andrea Rizzi	ETH Zurich
Thomas Rizzo	SLAC
Krzysztof Rolbiecki	IPPP Durham
Probir Roy	Saha Institute
Tuhin Roy	University of Oregon
Alberto Ruiz-Jimeno	Instituto de Fisica de Cantabria (IFCA, CSIC-Univ. Cantabria)
Timo Ruppell	HIP
Asli Sabanci	University of Helsinki
Yutaka Sakamura	RIKEN
Miguel-Angel Sanchis-Lozano	IFIC - Valencia University
Christian Sander	University of Hamburg
Pearl Sandick	UT Austin
Jose Santiago Perez	ETH Zurich
Yudi Santoso	IPPP, University of Durham
Veronica Sanz	Boston University
Gregory Schott	University of Karlsruhe
Nicolas Schul	UCLouvain
Philip Schuster	SLAC
Pedro Schwaller	University of Zurich
Goran Senjanovic	ICTP
Jihye Seo	Harvard University
Nicholas Setzer	University of Melbourne
Nausheen Shah	University of Chicago
Chung-Lin Shan	Seoul National University
Jing Shao	U of Michigan
Gabe Shaughnessy	Northwestern University / Argonne National Laboratory
Jessie Shelton	Rutgers University
Marc Sher	William and Mary
Mikhail Shifman	FTPI, Univ. of Minnesota
Satoshi Shirai	University of Tokyo
Yuri Shirman	UC Irvine
Jing Shu	IPMU
Vladislav Simak	Czech Technical University, Prague
Pekka Sinervo	University of Toronto
Kuver Sinha	Texas A&M University
Therese Sjaursen	University of Bergen
Scott Snyder	BNL
Roberta Sparvoli	UNiversity of Rome Tor Vergata and INFN
Christian Spethmann	Cornell University
Sogee Spinner	University of Wisconsin, Madison
Martin Spinrath	Max-Planck-Institut
Paola Squillacioti	INFN Pisa & Siena University
Oscar Stål	Uppsala University
Markus Stoye	Imperial College London
David Straub	TU München
Raimund Stroehmer	LMU Munich
John Strologas	University of New Mexico
Derek Strom	Northwestern University
Sergey Sukhoruchkin	Petersburg Nuclear Physics Institute