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THE MICHIGAN CENTER FOR THEORETICAL PHYSICS*

ANNUAL REPORT 2001-2002

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Each spring, the Director of The Michigan Center for Theoretical Physics shall present an annual report and submit the MCTP budget for the next fiscal year. This is the second.

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1 Overview

1.1 Message from the Director

The fiscal year July 2001-June 2002 was the first full year of operations for the MCTP and it proved to be a very successful one. There were five major scientific programs exemplifying the diverse activities of the MCTP: the "Quantum Applications" Symposium in July, the "Pattern Formation and Diffusion Limited Growth" workshop in August, the "CP violation" workshop in November, the "Mathematics and Physics of Extra Dimensions" workshop in April, and the "Fronts, Fluctuations and Growth" workshop in May.

Since its inception, MCTP members have already produced 114 publications in various areas of theoretical physics. These include:

* High Energy Physics: String theory, M-theory and D-branes, non-commutative geometry, particle physics phenomenology including CP violation and top quark and Higgs physics, $g-2$ and supersymmetry.

* Condensed Matter Physics: Critical dynamics, superconductivity, phonon radiation, bond percolation, vortex structures.

* Relativity and Astrophysics: Gravitational lensing, redshift surveys, X-ray astronomy, black holes, relativistic jets.

The list of publications may be found in appendix F.

The Special Topic of the The Institute for Scientific Information (ISI) for the month of February 2002 was 'Branes'. The lists of the world's Top 25 most highly cited papers and authors included 4 members of the MCTP:
(http://www.esi-topics.com/brane/index.html)

Among our visitors, we were pleased to host for the whole of April Sir Michael Atiyah FRS, Fields Medalist, past President of The Royal Society, past Master of Trinity College, Cambridge, founder and past Director of the Newton Institute for Mathematical Sciences, Cambridge. He delivered the Ford Motor Company Distinguished Lecture for 2002, "Geometry and Physics: A Marriage made in Heaven", the MCTP Colloquium "Polyhedra in Geometry, Physics and Chemistry", gave three lectures on "K-theory for physicists" during the MCTP workshop "Mathematics and Physics of Extra Dimensions" as well as a seminar "M-theory on manifolds of G_2 holonomy". This provided the perfect atmosphere for interdisciplinary interactions between the Math and Physics Departments. This was further enhanced by a visit from Philip Candelas, Rouse Ball Professor of Mathematics, University of Oxford who gave the MCTP Colloquium "The Mathematics and Physics of Counting", and accompanying lectures on the interface of string theory and number theory.

Another visiting theorist of note was Freeman Dyson who gave the Ta Yu Wu lecture for 2001 "Is life analog or digital?".

We welcomed eight new Full Members this year: Philip Bucksbaum, George Estabrook, Paul Horja, David Gerdes, Byron Roe, Timothy Chupp, Carl P. Simon and Christopher Monroe. There are currently 55 Full members from the departments of Astronomy, Biology, Chemical Engineering, Complex Systems, Materials Science, Mathematics and Physics. We are happy to note that the Full Membership includes several experimental colleagues who take an active interest in theory. In addition there are 57 Associate Members from even more diverse list of departments within and without Michigan.

At the end of this year, Executive Committee member Paul Berman (Interdisciplinary) will be stepping down to be replaced by Charles Doering, as will Len Sander (Condensed Matter/AMO/Biophysics) to be replaced by Bob Savit. I would like to take this opportunity to thank Paul and Len for their helpful advice and hard work during the initial start up of the MCTP and to welcome aboard Charlie and Bob.

In order to create space for the MCTP within the Physics Department, the Executive Committee and the Department jointly approved: (1) The conversion of 3424 Randall (previously Keith Riles's Lab) into 3 faculty offices (cost: $18,000=$48,000 less $30,000 from LS&A), (2) The addition of two smaller offices on either side of 3246 (the fishbowl) New Randall (cost: $58,000). These conversions are now both complete.

According to the bylaws, each spring, the Director of The Michigan Center for Theoretical Physics shall present an annual report and submit the MCTP budget for the next fiscal year. Since the fiscal year runs from July through June, however, this will necessarily be a projection rather than the actual budget. The actual budget will be given in the subsequent annual report. Accordingly, I have included in this summary the actual budget for fiscal 2000-2001, as well projected budgets for 2001-2002 and 2002-2003.

1.2 Major external funding

I am delighted to announce that the MCTP has secured its first major external funding: a $225,000 Matching Funds Grant for High Energy Theory 2001-2002 from the DOE (PIs Michael Duff, Gordon Kane and Jay Chapman). These MCTP matching funds (denoted Task T) are separate from, and in addition to, the regular high energy theory DOE grant (denoted Task G). The grant will be backdated to start November 2001.

All being well, this will be an annual grant for as long as MCTP is funded at its present levels. At the time of writing, a second proposal is pending with the DOE: MCTP Matching Funds Grant in High Energy Theory 2002-2005, $716,336 (PIs Michael Duff, Gordon Kane and Myron Campbell).

1.3 Further funding by the Dean

The initial funding for the center was \$400,000 from LS&A and \$50,000 from Physics for three and a half years. We were pleased to learn on May 14 that the Dean has extended this period of seed funding for a further 18 months, totaling five years from January 2001, as set out in the following letter to the Director:

> Dear Mike,
>
> Given the early successes of the Michigan Center for Theoretical Physics (MCTP), I am extending the current level of "seed funding" for an additional 18 months (that is, you will now have five years of funding from the date that funding commenced, rather than three and one-half). Funding will be at the same level as in the initial period.
>
> I wish you well in your continued endeavors on behalf of MCTP.
>
> Sincerely,
>
> Shirley Neuman

2 Fiscal year: 2000-2001

2.1 Conferences and workshops

Inaugural Conference "2001: A Spacetime Odyssey" - May 21-25, 2001

2.2 Visitors

Stephen F. King (Southampton) Jan. 22 - Feb. 01, 2001
Ben Craps (Chicago) Feb. 15-17, 2001
Andrea Romanino (Chicago) Feb. 22-24, 2001
Michael Melles (Switzerland) March 13, 2001
Peter van Nieuwenhuizeiv (Stony Brook) March 22-23, 2001
Ergin Sezgin (Texas A&M) April 19-21, 2001
Eric Bergshoeff (Groningen) May 10-23, 2001
John Bahcall (IAS) May 21-25, 2001
Jacob Bekenstein (Jerusalem) May 21-25, 2001
Stanley Deser (Brandeis) May 21-25, 2001
Paul Frampton (UNC, Chapel Hill) May 21-25, 2001
Wendy Freedman (Carnegie Observatories) May 21-25, 2001
Mary K. Gaillard (Berkeley) May 21-25, 2001
Sheldon Glashow (Boston) May 21-25, 2001
Alan Guth (MIT) May 21-25, 2001
James Hartle (UC Santa Barbara) May 21-25, 2001
Peter Higgs (Edinburgh) May 21-25, 2001
Arthur Jaffe (Harvard) May 21-25, 2001

Robert Kirshner (Harvard-Smithsonian) May 21-25, 2001
Andrei Linde (Stanford) May 21-25, 2001
Lev Okun (ITEP) May 21-25, 2001
Alexander Polyakov (Princeton) May 21-25, 2001
Helen Quinn (SLAC) May 21-25, 2001
John Schwarz (Caltech) May 21-25, 2001
Joseph Silk (Oxford) May 21-25, 2001
Isadore Singer (MIT) May 21-25, 2001
Paul Steinhardt (Princeton) May 21-25, 2001
Michael Turner (Chicago) May 21-25, 2001
Martinus Veltman (Michigan) May 21-25, 2001
Shing-Tung Yau (Harvard) May 21-25, 2001
Bruno Zumino (Berkeley) May 21-25, 2001

2.3 Outreach and media coverage

The MCTP is committed to public lectures and other outreach activities:

Gordon Kane, "Understanding the Physical universe", Saline Public Library Arts and Sciences Lecture Program, November 2000.

Michael Duff, "Can the Universe get any stranger?", Grosse Point Unitarian Church, February 11, 2001.

Fred Adams, "Death of a Universe", Saturday Morning Physics, March 10, 2001.

Leonard Sander, "Where Did All Those Fractals Come From?", Saturday Morning Physics, March 10, 2001.

Michael Duff, "The World in Eleven Dimensions", Oskar Klein Collegiate Professorship Inaugural Lecture,, Rackham Amphitheatre, March 16, 2001.

Gordon Kane, "How well can we understand the world?", public talk, Southampton University, England, April 2001

Gordon Kane, "Where are we in understanding the universe?", Ford Scientific Research Laboratory, Sigma Xi lecture, 2000

Gordon Kane, "The Particle Garden", Invited exhibitor, "Gardens", Villa Medici, Rome, 2000-2001.

See also the Art/Science Collaboration (http://www.umich.edu/ mctp/events/artphyscollab.html).

In addition the MCTP enjoyed the following media coverage.

See http://www.umich.edu/ mctp/media.html for web links:

Time, 25 June, 2001 How the Universe will end (Michael D. Lemonick)

Dallas Morning News, 19 June, 2001 A new theory suggests parallel universe triggered Big Bang (Tom Siegfried)

Dallas Morning News, 11 June 2001 Crash Scenario (Tom Siegfried)

Dallas Morning News, 4 June, 2001 Final Hubble reveals universe's vitals (Tom Siegfried)

Queen's University Belfast, June 2001 Unanswered questions in Physics (Martin Lamb)

Physics World, June 2001 Belfast confused by mystery questions (Matin Durrani)

Dallas Morning News, 28 May 2001 Higgs' rejection led to his boson's acceptance (Tom Siegfried)

The University of Michigan News and Information Services, May 25, 2001 Michigan Center for Theoretical Physics Interdisciplinary Activities

The University of Michigan News and Information Services, May 21, 2001 2001: A Spacetime Odyssey Opening Remarks by Prof. Michael J. Duff

Ann Arbor News, 17 May, 2001 Exhibit shows ties between physicists and artists (Anne Rueter)

The University of Michigan News and Information Services, May 10, 2001 Spacetime: where art and science meet May 21-25

The University of Michigan News and Information Services, May 10, 2001 Deadline approaches for physics conference

The University of Michigan News and Information Services, April 24, 2001 2001: A Spacetime Odyssey' will kick off activities at physics center

Physics Today, March, 2001 Michigan theory center

2.4 External funding

K. Freese, M. Duff, J. Liu, National Aeronautics & Space Administration (3/15/01), "2001: A Spacetime Odyssey" at the University of Michigan, May 21-25, 2001, $12,500.

M. Duff and J. Liu, Department of Energy (3/29/01), "2001: A Spacetime Odyssey", at the University of Michigan, May 21-25, 2001, $10,,000.

M. Duff and J. Liu, OVPR (3/23/01), "2001: A Spacetime Odyssey', at the University of Michigan, May 21-25, 2001, $7,500.

2.5 The 2000-2001 budget (actual)

Time period: 1 January 2001 to 30 June 2001 (actual)

Income:

LS&A	$213,000
Physics	$25,000
Grant income for conferences	$30,000
TOTAL	$268K

Expenditure:

Grant expenditure	$30,000
Inaugural conference	$100,000
DLA Workshop	$30,000
Director release time	$9,000
Secretary at 40%	$4,000
Computer manager	$8,297
Other salaries	$3,000
Computer hardware	$23,812
Software and supplies	$4,740
Discretionary funds (advertising, letterhead, entertaining,furniture)	$3,500
Visitors	$3,900
Office construction	$6,354
Fringe Benefits	$3,647
TOTAL	$230,250

SURPLUS $37,750

The large surplus was in anticipation of a further bill of $71,355 for office construction.

3 Fiscal year: 2001-2002

3.1 Conferences and workshops

"Quantum Applications" Symposium 2001 - July 1-3, 2001"
"Pattern formation and diffusion-limited growth" workshop - August 6-10, 2001
"CP Violation" workshop - November 5-16, 2001
"Mathematics and Physics of Extra Dimensions" workshop - April 8 - May 3, 2002
"Fronts, Fluctuations and Growth" workshop - May 12-31, 2002

3.2 Visitors

Takuzo Aida (University of Tokyo) July 1-3, 2001
Paul A. Benioff (Argonne National Lab) July 1-3, 2001
David Deutsch (University of Oxford) July 1-3, 2001
Arthur Ekert (University of Oxford) July 1-3, 2001
Gerald Gilbert (MITRE Corporation) July 1-3, 2001
Theodore Goodson, III (Wayne State University) July 1-3, 2001
Brian Josephson (University of Cambridge) July 1-3, 2001
Seth Lloyd (MIT) July 1-3, 2001
Lute Maleki (JPL) July 1-3, 2001
Chris Monroe (University of Michigan) July 1-3, 2001
Phil Platzman (Bell Labs) July 1-3, 2001
Bahaa Saleh (Boston University) July 1-3, 2001

Henry Stapp (Lawrence Berkeley National lab) July 1-3, 2001
Ted Steele (The John Curtin School of Medical Research) July 1-3, 2001
Stephen L. Squires (Hewlett-Packard Company) July 1-3, 2001
Peter Zoller (University of Innsbruck) July 1-3, 2001
Fred Adams (University of Michigan) Aug. 6-10, 2001
A. Aharony (Tel Aviv University) Aug. 6-10, 2001
Robin Ball (University of Warwick) Aug. 6-10, 2001
Jayanth Banavar (Pennsylvania State University) Aug. 6-10, 2001
Eshel Ben-Jacob (Tel Aviv University) Aug. 6-10, 2001
Benny Davidovitch (Exxon Research and Engineering) Aug. 6-10, 2001
Fereydoon Family (Emory University) Aug. 6-10, 2001
Dave Grier (University of Chicago) Aug. 6-10, 2001
Tom Halsey (Exxon Research and Engineering) Aug. 6-10, 2001
Matthew Hastings (Los Alamos) Aug. 6-10, 2001
George Hentschel (Emory University) Aug. 6-10, 2001
David Kessler (Bar-Ilan University) Aug. 6-10, 2001
Herbert Levine (University of California, San Diego) Aug. 6-10, 2001
Leonya Levitov (MIT) Aug. 6-10, 2001
Mark Mineev (Los Alamos Laboratory) Aug. 6-10, 2001
Luciano Pietronero (University of Rome) Aug. 6-10, 2001
Itamar Procaccia (Weizmann Institute of Science) Aug. 6-10, 2001
Evelyn Sander (George Mason University) Aug. 6-10, 2001
Ellak Somfai (University of Warwick) Aug. 6-10, 2001
Don Turcotte (Cornell University) Aug. 6-10, 2001
Dave Weitz (Harvard University) Aug. 6-10, 2001
Tom Witten (University of Chicago) Aug. 6-10, 2001
Konrad Schalm (Columbia University) Oct. 21-25, 2001
Rob Leigh (University of Illinois) Nov. 5-16, 2001
Antonio Masiero (ANL) Nov. 5-16, 2001
Joel Giedt (Berkeley) Nov. 5-16, 2001
Icarus Bigi (Notre Dame) Nov. 5-16, 2001
Lisa Everett (CERN) Nov. 5-16, 2001
Kiwoon Choi (KAIST) Nov. 5-16, 2001
Amarjit Soni (Ohio State University) Nov. 5-16, 2001
Sasha Dolgov (Ferrara, Italy) Nov. 5-16, 2001
David Atwood (Kentucky University) Nov. 5-16, 2001
Dermus Demir (University of Minnesota) Nov. 5-16, 2001
Rabi Mohapatra (Texas A&M) Nov. 5-16, 2001
Sandip Pakvasa (University of Hawaii) Nov. 5-16, 2001
Paul Frampton (University of North Carolina) Nov. 5-16, 2001
Joe Lykken (Fermilab) Nov. 5-16, 2001
Chris Kolda (Notre Dame) Nov. 5-16, 2001
Stuart Raby (Tel Aviv University) Nov. 5-16, 2001

Wai-Yee Keung (University of Illinois) Nov. 5-16, 2001
Maxim Pospelov (University of Sussex) Nov. 5-16, 2001
Dan Chung (CERN) Nov. 5-16, 2001
Mike Romalis (University of Washington) Nov. 5-16, 2001
Mariano Quiros (Madrid, Spain) Nov. 5-16, 2001
Alexey Petrov (Wayne State University) Nov. 5-16, 2001
Oleg Yakovlev (University of Wuerzburg) Nov. 5-16, 2001
Fabrizio Gabbiani (University of Iowa) Nov. 5-16, 2001
Karim Benakli (CERN) Nov. 5-16, 2001
Pierre Binetruy (University of Paris) April 21-28, 2002
Klaus Behrndt (Caltech) April 8-20, 2002
Mirjam Cvetic (University of Pennsylvania) April 8 - May 3, 2002
Thomas Dent (University of Michigan) April 8 - May 3, 2002
Chris Hull (Queen Mary) April 27 - May 3, 2002
Renata Kallosh (Stanford) April 28 - May 3, 2002
Sheldon Katz (University of Illinois) April 25-27, 2002
Ramzi Khuri (CUNY) April 26 - May 3, 2002
Igor Klebanov (Princeton) May 1-3, 2002
Hong Lu (University of Michigan) April 8 - May 3, 2002
Asad Naqvi (University of Pennsylvania) April 21 - May 3, 2002
Hermann Nicolai (Albert Einstein Institute) April 14-22, 2002
Burt Ovrut (University of Pennsylvania) April 21-27, 2002
Tony Pantev (University of Pennsylvania) April 14-26, 2002
Amanda Peet (Toronto University) April 28 - May 3, 2002
Chris Pope (Texas A&M) April 8 - May 3, 2002
Gary Shiu (University of Pennsylvania)April 15 - May 3, 2002
Glenn Starkman (Toronto University) April 15 - May 1, 2002
Mark Trodden (Syracuse) April 12-22, 2002
Arkady Tseytlin (Ohio State University) April 29 - May 3, 2002
Henry Tye (Cornell) April 8-12, 2002
Erik Verlinde (Princeton) May 1-3, 2002
Jacques Amar (University of Toledo) May 20-25, 2002
Russ Caflisch (UCLA) May 20-25, 2002
Jaume Casademunt (Spain) May 20-25, 2002
Weinan E (Princeton University) May 20-25, 2002
Ute Ebert (The Netherlands) May 20-25, 2002
Jim Evans (Iowa State University) may 20-25, 2002
Martin Falcke (Dresden, Germany) May 20-25, 2002
Mark Gyure (Los Angeles, CA) May 20-25, 2002
Ray Kapral (University of Toronto) May 20-25, 2002
Yannis Kevrekidis (Princeton University) May 20-25, 2002
Herbie Levine (University of California, San Diego) May 20-25, 2002
Carl Mueller (University of Rochester) May 13-25, 2002

Sidney Redner (Boston University) May 20-25, 2002
Giovanni Russo (University of Catania) May 20-25, 2002
Tim Schulze (University of Tennessee) May 13-25, 2002
James Sneyd (Massey University) May 20-25, 2002
Igor Sokolov (Universitat Freiburg, Germany) May 20-25, 2002
Dimitri Vvedensky (Imperial College, UK) May 20-25, 2002

3.3 Postdoctoral fellows

The MCTP advertised two postdoctoral positions in Physics Today:

> The Michigan Center for Theoretical Physics (MCTP) invites applications for two Postdoctoral Fellow positions starting in September, 2001. The MCTP is a new Center that has been created to promote research in theoretical physics, with a special emphasis on interdisciplinary studies. Workshops and conferences will provide a stimulating environment to explore new frontiers in theoretical physics. Candidates in any branch of theoretical physics (including, but not limited to, astrophysics, atomic, molecular and optical physics, condensed matter physics, high energy physics, and mathematical physics) will be considered, but preference will be given to candidates whose research bridges more than one discipline. Postdoctoral Fellows will be appointed for a period of two years, at a salary of $40,000 per year.
>
> Candidates should send a curriculum vitae, a research plan, and arrange to have three letters of reference sent to Professor Michael Duff, Director, Michigan Center for Theoretical Physics, Physics Department, University of Michigan, Ann Arbor, MI 48109-1120, mduff@umich.edu. Screening will begin on January 15, 2001 and will continue until the positions are filled.
>
> The University of Michigan is an affirmative action/equal opportunity employer.

The successful applicants were:

- Brent Nelson, a recent PhD under Mary K. Gaillard at Berkeley. Brent works on the interface of particle physics and astrophysics.

- Vladimir Malinovsky, Quantum Theory Project, University of Florida. Vladimir works on coherent control of quantum dynamics. Vladimir will be funded 50% by MCTP and 50% by FOCUS.

3.4 Graduate student fellowships

Part of our mission is the education of graduate students in theoretical physics and related mathematical sciences. The executive committee call for nominations for three MCTP Graduate Student Fellowships of $12,000 each, starting 1 July 2001, with an emphasis on interdisciplinary activities. After consultation with the Full Membership on 27 April, the Executive Committee elected the following candidates:

- Nam Hoon Lee, supervised by Jim Liu, "Mathematical aspects of string theory".
- Yi Li, supervised by Bob Savit, "Applications of statistical mechanics to social problems".
- Matt Lewis, supervised by Katie Freese, "A wavelet analysis of solar and anthropogenic forcings of climate change".

3.5 Undergraduate research scholars

The Michigan Center for Theoretical Physics recognizes the importance of an undergraduate research experience in the education of young physicists. Many of the research opportunities available to physics undergraduates are in experimental physics. MCTP would like to offer theoretical research opportunities to UM physics majors and to the external students participating in the departmental REU summer program. MCTP members are invited to submit proposals describing a possible theoretical research project that are accessible to undergraduates. There are two possible kinds of projects.

* a research project for a ten week summer internship-both UM majors and external REU students
* a one term Physics 415project-UM majors

The proposal should contain:

* The name of the MCTP member who will supervise the project
* A brief description of the project

A brief description of the expected outcome of the project (i.e. presentation at an undergrad research symposium, part of a paper in progress, poster presentation at a meeting, term paper by the student, part of undergraduate senior thesis.)

The project proposals will be used to recruit undergraduates interested in an MCTP research placement.

Research supervisors will be fully involved in the selection of appropriate students.

Please return your proposal to Jean Krisch, either by email (jkrisch@umich.edu) or place it in her mailbox.

The 4 successful applicants for Summer 2001 will each receive $1,600. They are:

1. Ms. Amy Kimball, U of M, supervised by Prof. Tim McKay, for matching for the internal REU program. She will be determining the relative positions and brightness of celestial objects such as stars and galaxies as part of the Sloan Digital Sky Survey.

2. Mr. Jonathan Efrom, U of M, supervised by Prof. L. Sander, for matching for the internal REU program. He will study computer simulations of fluid flow.

3. Ms. Daniela Paolotti, supervised by Prof. Franco Nori, is an Italian undergraduate arriving March 2001 to work for several months. She will be studying transport phenomena in granular media using event-driven simulation techniques.

4. Mr. Peter Dykema, U of M, supervised by Prof. Gus Evrard, for matching for the internal REU program. He will study various problems in astrophysics.

3.6 Outreach and media coverage

The MCTP is committed to public lectures and other outreach activities:

Jan Pieter van der Schaar, Saturday Morning Physics - "Music of the Spheres Lectures on String Theory"-December 2001.

August Evrard, Saturday Morning Physics - "Our Place in the Cosmos"-March 2002.

Charlie Doering , Saturday Morning Physics- "A Physicist's View of Turbulence"-April 2002.

In addition the MCTP enjoyed the following media coverage.

See http://www.umich.edu/ mctp/media.html for web links:

Nature, May 27, 2002 Life Can Go On Forever (Philip Ball)

Institute for Scientific Information, May 2002 Essay on "Branes" (Jianxin Lu)

New Scientist Magazine, April 2002 Holography (Finn Larsen)

Institute for Scientific Information, April 1, 2002 Interview with Michael Duff on "Branes" (Gary Taubes)

New Scientist, March 2002 Hunting the Higgs (Gordon Kane, Edward Witten)

The University of Michigan News and Information Services, March 22, 2001 Sir Michael Atiyah to discuss "marriage" of geometry and physics

BBC Television, UK, February 2002 Parallel Universes (Michael Duff)

Institute for Scientific Information, February 2002 Top cited authors on "Branes" (Michael Duff, Finn Larsen, Hong Lu, Jianxin Lu)

Dallas Morning News, 28 January, 2002 Cardassian Math Adds Dimension to Universe (Tom Siegfried)

New Scientist, January 2002 Hope for Higgs (Thomas Dent)

Physics World, October 2001 Constant Trouble (Michael Duff)

Physics Today, October 2001 Strings 2000's Top 10 Bemuse Belfast (Michael Duff)

CERN Courier, October 2001 Looking back on the story of the space-time odyssey (Michael Duff, Gordon Kane)

LSA Magazine, University of Michigan, Fall 2001 Physicists Make Art; Artists Do Physics (Lois Kane)

3.7 Successful proposals

The Executive Committee invited proposals for programs for the next Fiscal year 1 July 2001 – 30 June 2002 with a closing date of 15 March 2001. These can be for any of the Center's activities: conferences, workshops, visitors, postdocs, graduate students, undergraduate research, outreach etc. Although the Executive Committee will consider programs deemed to be "interdisciplinary" simply by virtue of their diversity, more weight will be attached to proposals that fulfill the Center's mission of being "more than the sum of its parts" by involving a genuine interplay of different subject areas. More weight will also be attached to proposals than can offer some degree of cost sharing.

When the Center was established, the Dean made clear that she expects substantial external funding by the time the College reviews the Center's position in 2004. Consequently we encourage members to make external grant proposals submitted under the aegis of the MCTP, which would then be eligible for MCTP cost sharing.

Since the Center's goals include educating the general public on theoretical physics and related mathematical sciences, Members are encouraged to let us know of any outreach activities with which they may have been involved.

The Committee received 26 proposals for various activities and, after careful consideration, has recommended the following for approval by the Physics Department:

COMPUTING

Computing (Computing Committee)	\$50,000

VISITORS

Visitor program in String and M-theory (Duff)	\$25,000
	(+\$50,000 cost sharing)
Hang-Cai Ren (Liu)	\$3,000
	(+\$1,000 cost sharing)
Frenk and White (Evrard)	\$8,000
Vega (Kane)	\$10,000
Nayak (Berman)	\$5,000
Search (Berman)	\$2,000
Gondolo and Abel (Freese)	\$5,000
Cattuto (Nori)	\$4,000
Yndurain (Akhoury and Federbush)	\$5,000

WORKSHOPS

"CP violation", November 5-16, 2001	
(Akhoury, Chupp, Einhorn, Freese, Kane and Yao)	\$30,000
	(+\$2,500 cost sharing)
"Fronts, fluctuations and growth", May 5-31, 2002	
(Doering, Sander, Smereka and Ziff)	\$45,000
"Mathematics and physics of extra dimensions", April 8 - May 3, 2002	
(Burns, Dolgachev, Duff, Freese, Liu)	\$50,000
	(+\$10,000 cost sharing)
"Quantum Applications Symposium", July 1-3, 2001	
(Veridian, Erim and MCTP)	\$2,500

STUDENTS

Graduate Student Fellowships	\$36,000
Undergraduate Research Scholarships	\$6,400

TOTAL

\$339,140 (Visitors \$67,000, Conferences \$127,500, Computing \$50,000 Grad Students \$36,000, undergraduate students \$6,400, Cost sharing \$52,240)

In addition, the following workshop was approved for the 2002–2003 fiscal year:

"Decoherence Control and Quantum Computing"	
(Berman, Geva, Monroe)	\$30,000
	(+\$5,000 cost sharing)

3.8 External funding

L. Sander, National Aeronautics & Space Administration (2/1/01), "Workshop on Pattern Formation and Diffusion-Limited Growth", \$15,000

L. Sander, Schlumberger (2/1/01), "Workshop on Pattern Formation and Diffusion-Limited Growth", \$5,000.

L. Sander, Complex Systems, U of M (2/1/01), "Workshop on Pattern Formation and Diffusion-Limited Growth", \$10,000.

Gift from Murray Deutsch (plus matching from Mobil), \$3,000

Gift from Veridian \$5,000

3.9 The 2001-2002 budget (projected)

Time period: 1 July 2001 to 30 June 2002

Income:

LS&A	$400,000
Physics	$50,000
Grant income for conferences	$30,000
Gifts	$8,000
Surplus from 2000-2001	$37,750
TOTAL	$525,750

See also cost sharing on conferences ($22,500), cost sharing on visitors ($51K).

Expenditure:

Grant Expenditure	$30,000
Construction	$71,355
Director release time	$9,000
Secretary at 40%	$13,600
Computer manager	$36,870
Computer hardware	$4,316
Software & supplies	$5,175
Discretionary funds	$5,000
Visitor program	$41,964
1.5 MCTP Postdoctoral fellows (10 months)	$60,000
3 MCTP Graduate Student Fellowships	$36,000
4 MCTP Undergraduate Research Scholars	$10,627
Fringe Benefits	$25,400
“CP violation” workshop	$30,000
“Fronts, fluctuations and growth” workshop	$45,000
“Mathematics and physics of extra dimensions” workshop	$50,000
“Quantum Applications Symposium” (Veridian, Erim and MCTP)	$2,500
TOTAL	$476,807

See also cost sharing on conferences ($22,500), cost sharing on visitors ($51,000).

SURPLUS $48,943

The large surplus was a result of $50,000 contribution from FOCUS for postdoc support.

4 Fiscal year: 2002-2003

4.1 Conferences and workshops

“Perspectives in Decoherence Control and Quantum Computing”, August 2002
“Inflation in Particle Theory”, 2003
“QCD and Strings”, 2003
“Great Lakes Cosmology”, May 2003
“Baryogenesis”, 2002
“Quantum Applications Symposium” (Veridian, Erim and MCTP), 2003

4.2 Postdoctoral fellows

Brent Nelson and Vladimir Malinovsky will continue for a second year.

4.3 Graduate student fellowships

S. Chivoret (Doering, Nori)	\$12,000
J. Park (Tkachenko)	\$12,000
E. Quintana (Adams)	\$12,000
S. Olsen (Raithel)	\$12,000
T. Wang (Kane)	\$12,000
J. Davis (Larsen)	\$12,000
J. DeVita (Sander)	\$3,300

4.4 Undergraduate research scholars

G. Ghoshal (Sander)	\$1850
A. Kimball (McKay)	\$1850
B. Kelly (McKay)	\$1850
J. Recusin (McKay)	\$1850
M. Lamarca (Riles)	\$1850

4.5 Successful proposals

The Committee received 30 proposals for various activities and, after careful consideration, has recommended the following for approval by the Physics Department:

COMPUTING

Computing (Computing Committee) \$37,000

COST SHARING

"Quantum Computing with Superconducting Qubits" (Nori)
(\$300,000 AFOSR grant+Cost Sharing: \$5,000 Physics; \$5,000 LSA)
\$10,000

WORKSHOPS

"Perspectives in Decoherence Control and Quantum Computing", August 2002	
(Berman, Bloch, Geva, Monroe, Nori, Rangan)(+$5,000 cost sharing)	$30,000
"Inflation in Particle Theory", 2003	
(Einhorn, Freese, Kane)	$20,000
"QCD and Strings", 2003	
(Akhoury)	$30,000
"Great Lakes Cosmology", May 2003	
(Adams, Akerlof, Evrard, Freese, McKay, Riles, Tarle;	
G. Bernstein, R. Bernstein, Bregman, Mateo, Richstone, Somerville)	$21,000
"Baryogenesis", 2002	
(Einhorn,Freese,Kane)(+$20,000 cost sharing)	$10,000
"Quantum Applications Symposium", 2003	
(Berman, Monroe, Nori)	$30,000

VISITORS

Visitor program for young string theorists (Larsen, Liu, Pando-Zayas)	$25,000
M. Perry, 4 months (Kane)	$22,200
J. X. Lu, 4 months (Duff)	$22,200
P. Ko, 2 months (Yao)	$11,100
I. M. Sokolov, 1 month (Sander)	$5,550
J. Wudka, 1 month (Einhorn)	$5,550
H. Krishnamurthy, 2 weeks (Moukori)	$2,775
C. Bourbonnais, 2 weeks (Moukori)	$2,775

GRADUATE STUDENT FELLOWSHIPS

S. Chivoret (Doering, Nori)	$12,000
J. Park (Tkachenko)	$12,000
E. Quintana (Adams)	$12,000
S. Olsen (Raithel)	$12,000
T. Wang (Kane)	$12,000
J. Davis (Larsen)	$12,000
J. DeVita (Sander)	$3,300

UNDERGRADUATE RESEARCH

G. Ghoshal (Sander)	$1850
A. Kimball (McKay)	$1850
B. Kelly (McKay)	$1850
J. Recusin (McKay)	$1850
M. Lamarca (Riles)	$1850

PUBLICATIONS CHARGES

(Freese, Lewis)	$1,000

TOTAL

$370,700 (Workshops $141,000, Visitors $97,150, Grad Students $75,300, Undergraduate Students $9,250, Cost sharing $10,000, Computing $37,000, Publications charges $1,000.)

There were no postdoc openings this year. The two current MCTP postdocs Brent Nelson and Vladimir Malinovsky will continue for a second year.

4.6 External funding

P. Berman and C. Monroe, FOCUS Group, U of M (2/07/02), "Workshop on Decoherence Control and Quantum Computing", $15,000.

M. Duff, G. Kane and J. Chapman, Department of Energy (1/18/02), "Michigan Center for Theoretical Physics Matching Funds 2001-2002", $225,000.

M. Duff, G. Kane and M. Campbell, Department of Energy (1/18/02), "Michigan Center for Theoretical Physics Matching Funds 2002-2005, $716,336 (Pending).

J. Liu, M. Duff and F. Larsen, National Science Foundation (2/12/02), "Workshop on the Mathematics and Physics of Extra Dimensions", April 8-May 3, 2002, Ann Arbor, $9,800 (Pending).

F. Nori "Quantum Computing with Superconducting Qubits", $300,000 AFOSR grant+Cost Sharing: $5,000 Physics; $5,000 LSA; $10,000 MCTP.

4.7 The 2002-2003 budget (projected)

Time period: 1 July 2002 to 30 June 2003

Income:

LS&A	$400,000
Physics	$50,000
Grant income for conferences	$15,000
Surplus from 2001-2002	$48,943
TOTAL	$513,943

See also section 4.6 for MCTP DOE Matching Funds grants 2001-2004 ($941,336 pending), conferences (NSF $9,800 pending).

Expenditure:

Director release time	$9,000
Secretary at 40%	$14,500
Computing	$37,000
Cost sharing	$10,000
Discretionary funds	$35,000
Visitor program	$97,150
1.5 MCTP Postdoctoral fellows	$80,000
7 MCTP Graduate Student Fellowships	$75,300
5 MCTP Undergraduate Research Scholars	$9,250
"Quantum Computing" workshop	$30,000
"Inflation" workshop	$20,000
"QCD and Strings" workshop	$30,000
"Cosmology" workshop	$21,000
"Quantum applications" symposium	$30,000
"Baryogenesis" workshop	$10,000
Publications charges	$1,000
Office furniture	$5,000
TOTAL	$514,200

DEFICIT $257

The discretionary funds will permit applications throughout the year for visitors or other activities unforseen at the time of the proposal deadline.

5 Acknowledgments

I would like to take this opportunity to thank the Executive Committee: Ratin Akhoury, Paul Berman, Katie Freese and Len Sander, as well as members of the other MCTP committees, for their wisdom and hard work. Thanks are also due to the MCTP secretary, Angie Yerks, to the Computer Manager, Alex Batrachenko, and to Jim Liu for his advice and assistance.

A Proposal

A.1 Purpose

It is proposed to establish a multi-disciplinary Center for Theoretical Physics within the Physics Department at the University of Michigan. Michigan has a long tradition of excellence in Physics and the main purpose of such a Center would be to build on its current strengths and recover the pre-eminence that it enjoyed in earlier times. The Department ranks 13 nationally and is poised to move even higher, but this will require the extra resources in theoretical physics that other top research universities are currently investing. Without the need for expensive apparatus, theory is a very cost-effective way of contributing to the prestige of the University.

The Physics Department 5-year plan calls both for an increased emphasis on theory in the Physics Department and a breaking down of barriers between the various sub-disciplines. The ideal way to achieve these ends is to put all the theorists (high energy, astrophysics and cosmology, condensed matter, complex systems, atomic and biophysics) under the same umbrella and, ideally, in the same location. The emphasis of the proposed Center would thus be interdisciplinary, with the aim to make it more than the sum of its parts. Theoretical Physics is particularly suited to such a collective venture; it is a highly collaborative enterprise, publications are almost always multi-authored and physicists of all stripes share a common world view and intellectual discourse. The intention is also to include other departments within the University and to explore non-traditional applications.

Theorists have needs and aspirations that cut across these various fields of interest. Such a center would also give them a collective voice in the department that would complement the other established programs of Applied Physics, Ultrafast Optics, Complex Systems and the Biophysics initiative.

The creation of a Center for Theoretical Physics at the University of Michigan represents an important investment in the future of the Department. By attracting the best international scholars to participate in workshops and conferences, the Center will serve as a continuous stimulus to theoretical research activities at the University. Once the reputation of the program is established, it will help us to recruit the highest caliber faculty, postdocs, and graduate students. The increased visibility of the theoretical physics program at the University of Michigan should increase the prospects for external funding.

The award of the 1999 Nobel Prize to Michigan theoretical physicist Martinus Veltman provides the ideal timing to launch such an initiative. The hosting of the forthcoming Strings 2000 international conference [a]on the Michigan campus next July will also be an opportunity to focus attention on the strength of theoretical physics in the department.

[a]http://feynman.physics.lsa.umich.edu/strings2000/

A.2 Interdisciplinary scientific program

A main thrust of the Center's activities would be a vigorous visitor and conference program consisting of visits by individual leading theoreticians, visits by collaborators of the current faculty, one large conference per year ($\sim$ 1 week long and 50 participants) and two medium-term workshops (2–3 months long and 10–20 participants). The lifeblood of any physics research program is provided by the younger physicists and the Center intends to support 2 postdocs and 3 graduate students (to be chosen worldwide). Summer salary will also be provided to two students to carry out undergraduate research projects.

The center we propose is a natural venue for encouraging interdisciplinary work because the methods and point of view of theoretical physics have influenced many scientific disciplines ranging from mathematics to economics. We hope to devote some substantial fraction of the workshops that we will organize to subjects that cut across boundaries of University departments. This would have the added benefit that many scientists on our own campus would be natural members in these programs. This would leverage the strength of the University in attracting prominent outside participants, and would open up our department to closer links with the rest of the campus. With a view to enhancing the public understanding of science in general, the Center would host public lectures by leading scientists intended for the University as a whole and the Ann Arbor community.

A few examples of the kinds of work we have in mind and the likely areas of overlap are: 1) The study of turbulence and fractal dynamics (Engineering, Mathematics, Physics); 2) Statistical physics, polymer physics, complex fluids, biocomplexity and the mechanics of biological materials (Chemistry, Engineering, Physics, Biological Sciences, Medical Sciences, Physics); 3) Complex adaptive systems (Social Sciences, Physics); 4) Superstring Theory and M-theory, differential geometry and topology (Mathematics, Physics); 5) Particle Physics and astrophysics (Astronomy, Mathematics, Space Sciences, Physics); 6) General aspects of quantum field theory (Mathematics, Physics); 7) Quantum information and quantum computing (Mathematics, Chemistry, Engineering, Physics); 8) Large scale simulations and data mining (Mathematics, Computer Science, Physics, Engineering).

A.3 Administration

The administration will consist of a Director and a 4-person Executive Committee. They will produce an annual report. The Director will be appointed for a 4-year term and will teach half-time (the time commitment of the Director is expected to be comparable to that of an Associate Chair in Physics or to the Director of other research centers on campus). In contrast to many other comparable centers, all other members of the Center will continue their full teaching duties. However, the Center's mission would be greatly enhanced by an increase in the number of 600 level research-oriented advanced courses in theoretical physics. Ideally, the topics taught would be correlated with the current themes of the Center's program. In addition, there will be an External Advisory Committee made up of internationally renowned senior theoretical physicists. An external review of the Center's progress should be carried out every three years.

The staff requirements are one senior secretary/administrative assistant and one computer manager. In terms of space needs, the Center will be housed within the Physics Department; it requires the appropriate reallocation of present office space (about 10-15 offices or the equivalent).

Membership and participation in the Center is open to all members of the Physics faculty, postdocs, and graduate students involved in theoretical physics research. These numbers currently stand at 18 faculty, 7 postdocs, and 16 graduate students. Members will have access to the Center's resources and faculty members will have a voice in its governance. Participation by and interaction with our experimental colleagues will, of course, be welcomed and encouraged. It is our hope and expectation that members of other departments at the University of Michigan will actively participate once the Center becomes established.

A.4 Computing needs

In order to bring researchers together and foster collaborations that might not otherwise occur, a unified computing environment is essential, including both basic communications resources (such as email, word processing, Internet access) and substantial computational ability.

The computing needs can be placed within three broad classes: 1) Hardware: 4 Pentium PCs ($12K), 1 workstation ($10K), printers etc ($5K); 2) Software: ($5K); 3) Staff support: ($35K). The Physics Department presently maintains an Office of Computing Support; an additional 0.5 full time equivalent (FTE) position must be added to this computing office and will be officially designated for support of the Center's computers and other needs.

A.5 Budget

Personnel: 2 postdoctoral students ($50K each, including standard benefits), 3 graduate students at 0.5 time ($80K); 2 undergraduate summer salaries ($6K); senior visitors ($80K), 1 secretary ($40K), director administrative differential ($5K), computer staff at 0.5 time ($35K).

Activities: 2 medium-term workshops of 2-3 months ($75K); 1 major conference ($25K)

Telephone and supplies: ($4K)

We have not included the cost of new faculty hires in theoretical physics since these are, in any case, part of the Department's five year plan.

This brings the total to $450K annually. This proposal asks the University to contribute $425K per year, the remaining $25K to be supplied by the Physics Department to fund the major conference. The Physics Department will also contribute $60K in the first year for computer hardware and for Director release time.

The Center will also be seeking outside funding from federal funding agencies.

A.6 Comparisons with similar theory institutes

Well-established centers for Theoretical Physics include the Institute for Theoretical Physics, UCSB, which is broadly based ($700K per year from the University) and the C. N. Yang Institute for Theoretical Physics SUNY Stony Brook,which is predominantly high energy physics, ($400K per year from the University). Recently, however, theoretical physics has witnessed exciting breakthroughs on several different fronts which many of the top universities have recognized with increased funding. Some more recent initiatives include the University of Minnesota Theory Institute, Rutgers High Energy Theory Institute, San Diego Institute for Nonlinear Sciences, the Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, the Center for Advanced Mathematical Sciences, American University of Beirut, Lebanon, and the Center for Theoretical Astrophysics, University of Toronto. Just in the last year, Stanford, Berkeley and Caltech/USC have each started theory initiatives of roughly the same order envisioned for Michigan (about $500K per year).

A.7 Impact summary

Research

This proposed Center for Theoretical Physics is expected to have a substantial positive impact on the Physics Department and on the University of Michigan as a whole. First and foremost, the Center will facilitate research in theoretical physics at the University of Michigan; we plan to extend and improve upon Michigan's long tradition of excellence in physics and science in general, and make the Physics Department and the LS&A greater than the sum of its parts.

Links outside physics

The Center will also establish a platform for interdisciplinary research and will provide opportunities for collaboration that would not otherwise exist; this synergy cannot be overemphasized. With the activities described in section 2, links will be established to the Departments of Mathematics, Astronomy, Chemistry, Computing, Engineering, Space Sciences, Biological Sciences and Social Sciences.

Although there is a long tradition of overlap between theoretical physics and *applied* mathematics, the last several years have witnessed dramatic and somewhat unexpected collaborations between theoretical physicists and *pure* mathematicians (so much so that physicists are even winning Fields Medals!). This is due, in large part, to the realization that superstring theory, and its successor M-theory, require abstract concepts from algebraic topology and differential geometry. This has been a two-way process with pure mathematicians frequently drawing their inspiration from string theory and quantum field theory. Preliminary contacts with our colleagues in Mathematics (Al Taylor, Paul Federbush, Daniel Burns, Joel Smoller, Igor Dolgachev, Alejandro Uribe) have elicited an enthusiastic response.

Graduate education

In addition to providing a stimulating environment for physics graduate students to learn and carry out their research, and in addition to the funding of 3 extra graduate students, it is intended that there be an increase in the number of 600 level research-oriented advanced courses in theoretical physics; the topics taught to be correlated with the current themes of the Center's program.

Undergraduate education

In several areas of theoretical physics, for example condensed matter and statistical physics, undergraduates routinely participate in research projects. The Center intends to fund two students summer salaries for this purpose. The interdisciplinary nature of of the Center will further contribute to the success of the growing number of courses for non-physics-majors. For example, theoretical investigations into the far future of the universe has already led to a new course (now Physics 105) that uses the results of original research to teach the fundamentals of physics to a general student audience.

Visibility

Because of the high profile nature of theoretical physics, our successes in this area will greatly increase the stature and visibility of the Department and the University; this boost, in turn, will be invaluable in future recruiting of faculty, graduate students, and postdoctoral fellows. Finally, the Center will provide a showcase for the theoretical research done here at Michigan, both to the physics community (through conferences, workshops, and visitor programs) and to the general public (through public lectures and other outreach activities).

B Bylaws

B.1 Purpose

The Michigan Center for Theoretical Physics (MCTP) is an organization within the Physics Department of the University of Michigan whose primary aim is to promote interdisciplinary research in theoretical physics and related fields through a program of individual and collaborative research, seminars, workshops and conferences. It also aims to educate graduate and undergraduate students in theoretical physics and to communicate its activities to the general public through public lectures and other outreach activities.

B.2 Governance

The administration shall consist of a Director and a four-person Executive Committee. They shall report to the Chair and Executive Committee of the Physics Department. The Director shall present an annual report and submit the MCTP budget for the next fiscal year at a joint meeting of the Department and MCTP Executive Committees each spring.

The first Director shall serve until the end of the initial funding period, July 2004. The Directorship is non-renewable. Subsequent Directors shall serve for 3-year terms. The Director shall be offered relief from teaching responsibilities at a level agreed upon by the Dean of LS&A. Two members of the initial Executive Committee shall serve for 3-year terms and two for 2-year terms. Subsequent committee members shall serve for two year terms. Membership of the Executive Committee is non-renewable. Retiring members are ineligible to serve again for another two years. There shall be one member from each of the following three Physics Department sub-fields: 1) Particle Theory, 2) Astrophysics, Cosmology and Relativity, 3) Condensed Matter and Atomic and Molecular Physics and Biophysics. The fourth member can be from any field including those in other Departments.

The Director and Executive Committee shall be elected by Full Members of the Center (see below), for approval by the Physics Department Chair, and must themselves be Full Members. Elections shall be held each spring at a general meeting of Full Members of the Center. At the Election meeting, nominations for each open position will be taken from the floor without limit. Voting will then take place by secret ballot. On each ballot, the nominee receiving the fewest votes (including ties) will be eliminated and this procedure will be continued until one candidate receives a majority of the votes. At least two general meetings, Fall and Winter, will be called each academic year, with at least two weeks advanced notice. Four weeks before each general meeting there will be a call for agenda items.

The Director and Executive committee shall solicit proposals for the Center's activities from the Full Membership. However, responsibility for the budget and the scientific program, including choice of visitors, choice of workshops and conferences and choice of postdoctoral fellows and graduate students rests with the Director and Executive Committee. The Executive Committee shall be advisory to the Director in all matters except for the choice of postdoctoral fellows and graduate students which shall be decided by majority vote of the Director and Executive Committee. There shall be a meeting of the Full Members before decisions on postdoctoral fellows and graduate students are made.

The Director and Executive committee shall appoint sub-committees as deemed appropriate which must include a standing committee on diversity.

Any changes to the bylaws must be approved by two-thirds majority vote at a meeting of Full Members of the Center, notice of the meeting and the proposed changes to be given at least two weeks prior to the meeting.

B.3 Membership

There shall be two classes of membership: Full Members and Associate Members.

Full members must be faculty at the University of Michigan. They may participate in the activities of the Center and vote on the selection of the Director and Executive Committee and on the admission to Full Membership. With the approval of the Director and Executive Committee, they may also apply for grants associated with the Center's activities. Faculty may apply for Full Membership by completing the appropriate form. Applications must be approved by a majority vote of existing Full Members, in attendance at one of the general meetings of the Center. The initial Full membership shall consist of all Theoretical Physics Faculty (see below). Full Membership shall be subject to review by the Director and Executive Committee. In cases where it is believed a member is no longer actively involved with the Center and after consultation with the member, that member's Full Membership may be revoked by a majority vote of the current Full Members at a general meeting. A member whose Full Membership has been revoked can apply for readmission as a Full Member after a one year period.

Associate membership is open to others affiliated with the University of Michigan who have an interest in the Center's activities, on completion of a simple request form and subject to the approval of the Director and Executive Committee. Associate members may participate in the activities of the Center, but have no voting rights. Termination of Associate Membership is at the discretion of the Director and Executive Committee.

All members may, with the approval of the Director and Executive Committee, organize workshops and conferences but these must be sponsored by at least one Full Member and proposals must be submitted in a timely manner. All members are expected to display the address of the Center on relevant publications.

C Membership list

C.1 Full members

F. Adams (Physics)
R. Akhoury (Physics)
P. Berman (Physics)
A. Bloch (Mathematics)
J. Bregman (Astronomy)
D. Burns (Mathematics)
T. Chupp (Physics)
C. Doering (Mathematics)
I. Dolgachev (Mathematics)
M. Duff (Physics)
M. Einhorn (Physics)
A. Evrard (Physics)
M. Falk (Materials Science and Engineering)
P. Federbush (Mathematics)
G. Ford (Physics)
J. Fornaes (Mathematics)
K. Freese (Physics)
D. Gerdes (Physics)
E. Geva (Chemistry)

K. Hecht (Physics)
P. Hughes (Astronomy)
G. Kane (Physics)
S. Krimm (Biophysics)
J. Krisch (Physics)
F. Larsen (Physics)
R. Lewis (Physics)
J. Liu (Physics)
F. MacKintosh (Physics)
T. McKay (Physics)
C. Monroe (Physics)
S. Moukouri (Physics)
M. Newman (Physics)
F. Nori (Physics)
L. Pando Zayas (Physics)
G. Raithel (Physics)
D. Richstone (Astronomy)
B. Roe (Physics)
A. Rojo (Physics)
L. Sander (Physics)
R. Savit (Physics)
C. Simon (Complex Systems)
J. Smoller (Mathematics)
R. Spatzier (Mathematics)
A. Tkachenko (Chemical Engineering)
Y. Tomozawa (Physics)
A. Uribe (Mathematics)
J. Vandermeer (Biology)
M. Veltman (Physics)
D. Williams (Physics)
A. Wu (Physics)
E. Yao (Physics)
R. Ziff (Chemical Engineering)
M. Zochowski (Physiology)

C.2 Associate members

K. Augustyn (Research & Development)
J. Baker (Physics)
A. Batrachenko (Physics)
J. Bialek (Physics)
F. Bookstein (Gerontology)
M. Brehob (Electrical Engineering and Computer Sciences)

J. Carroll (Material Science & Engineering)
J. Chapman (Physics)
Y. Chushak (Chemistry)
J. Davis (Physics)
T. Dent (Physics)
T. Donohue (Physics)
B. Dubetsky (Physics)
P. Federbush (Mathematics)
G. Flynn (Pharmacy)
T. Foth (Mathematics)
D. Garfinkle (Oakland University)
E. Glass (University of Windsor)
A. Greenspoon (Mathematical Reviews)
P. Ion (Mathematical Reviews)
L. Ji (Mathematics)
S. King (Physics)
R. Krasny (Mathematics)
M. Lewis (Physics)
D. Li (Physics)
Y. Li (Physics)
R. Lindner (History)
H. Lu (Physics)
J. Lu (Physics)
S. Malinovskava (Physics)
V. Malinovsky (Physics)
D. Manna (Physics)
F. Marchesoni
D. Maxwell (Romance Languages and Literature)
M. Mbonye (Physics)
L. Moffatt (Physics)
E. Myers (Physics)
B. Nelson (Physics)
T. O'Donnell (Physics)
L. Okun (Physics)
L. Paniak (Physics)
D. Park (Physics)
G. Park (Physics)
A. Pawl (Physics)
A. Petrov (Physics)
C. Rangan (Physics)
M. Ross (Physics)
M. Ryan (School of Information)
H. Sati (Physics)

C. Search (Physics)
Q. Shi (Chemistry)
P. Smereka (Mathematics)
N. Soparkar (Electrical Engineering and Computer Sciences)
J. Van der Schaar (Physics)
P. Vetter (Physics)
H. Wang (Physics)
L. Wang (Physics)
C. Warren (Physics)
S. Wen (Physics)
W. Zhou (Physics)

D Postdocs, graduate students and long-term visitors

D.1 Postdocs

T. Dent
H. Lu
J. Lu
V. Malinovsky
B. Nelson
Q. Shi
J. Van der Schaar

D.2 Graduate students

J. Baker
A. Batrachenko
J. Bialek
M. Franke
V. Huang
M. Lewis
D. Li
Y. Li
D. Manna
L. Moffatt
A. Pawl
H. Sati
C. Search
P. Vetter
H. Wang
L. Wang

C. Warren
S. Wen
W. Zhou

D.3 Long-term visitors

Fabio Marchesoni (U. of Perugia) Oct. 25, 2000 - July 15, 2001
Gye T. Park (Yonsei University) Feb. 2001 - Feb. 2002
DaeKil Park (Korea) April 2001 - January 2003
Lev Okun (Moscow, Russia) May 7 - 23, 2001
Lori Paniak (Princeton) July 2001 - July 2002
Roberto Vega (Southern Methodist University) Aug. 2001 - Aug. 2002
Francisco Yndurain (Madrid, Spain) Nov. 5 - Dec. 4, 2001
Nilakantha Nayak (India) Dec. 2001 - Feb. 2002
Sir Michael Atiyah (University of Edinburgh) April 2002
Malcolm Perry (Cambridge) March 26 - April 11, 2002

D.4 Computer manager

A. Batrachenko

D.5 Secretary

A. Yerks

E Committees

E.1 Executive Committee of the MCTP

M.J. Duff (Director)
R. Akhoury (Particle Theory)
L. Sander (Condensed Matter/AMO/Biophysics)
K. Freese (Astrophysics/Cosmology/Relativity)
P. Berman (Interdisciplinary)

E.2 Computing

A. Batrachenko
A. Evrard
J. Liu (Chair)
F. Nori

E.3 Diversity

K. Freese (Chair)
J. Krisch
L. Pando-Zayas

E.4 Facilities

A. Akhoury (Chair)
P. Berman

E.5 Funding

R. Akhoury
P. Berman
D. Burns
M. Duff (Chair)
K. Freese
L. Sander

E.6 Undergraduate research

J. Krisch (Chair)
F. Nori

F Publications

MCTP-00-01 M. J. Duff, State of the Unification Address

MCTP-00-02 M. Cvetic, M. J. Duff, James T. Liu, H. Lu, C. N. Pope, K. S. Stelle, Randall-Sundrum Brane Tensions

MCTP-00-03 D'Anna, Nori, Critical Dynamics of Burst Instabilities in the Portevin-Le Chatelier effect

MCTP-00-04 Reichhardt, Olson, Nori, Wigner Crystal Dynamics

MCTP-00-05 Olson, Nori, Effects of Columnar and Point Defects on Magnetic Hysteresis Curves Produced by 3-dimensional Vortices in Layered Superconductors

MCTP-00-06 Y.-L. Lin, Nori, Feynman Path-Integral Analytical Studies of Quantum Interference for Superconducting Networks and Josephson Junction Arrays in Magnetic Fields

MCTP-00-07 Thomas Dent, CP violation and target-space modular invariance

MCTP-00-08 M. Cvetic, G.W. Gibbons, H. Lu and C.N. Pope, Ricci-flat Metric, Harmonic Forms and Brane

Resolutions

MCTP-00-09 R. Akhoury, H. Wang, O. Yakovlev, Higgs Boson Production in Photon-Photon Collisions

MCTP-00-10 Oleg Yakovlev and Stefan Groote, On t anti-t threshold and top quark mass definition

MCTP-00-11 A. Akhoury, H. Wang, O. Yakovlev, On large logarithms in Higgs-¿gamma gamma decay

MCTP-00-12 C. Cattuto, G. Costantini, T. Guidi, F. Marchesoni, Linear Strings in Solids

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