MCTP-03-31

THE MICHIGAN CENTER FOR THEORETICAL PHYSICS*

ANNUAL REPORT 2002–2003

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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 third.

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Contents

One of the most exciting intellectual explorations of our time concerns the mathematical structure underlying our physical universe. The Michigan Center for Theoretical Physics is a focal point in this activity, and attracts many of the outstanding mathematicians and physicists working in this area. It deserves the support of all who value intellectual discovery at the highest level.

— Sir Michael Atiyah, Founder/Director,
The Isaac Newton Institute for Mathematical Sciences, Cambridge

1 Overview

1.1 Message from the Director

The fiscal year July 2002-June 2003 proved to be another successful one for the Michigan Center for Theoretical Physics (MCTP). There were six major scientific programs exemplifying the diverse activities of the MCTP: the "Decoherence Control and Quantum Computing" workshop in August; the "Time-Dependent Backgrounds in String Theory" workshop in March; the "QCD and Strings" workshop in April; the "Great Lakes Cosmology" in May; the "Baryogenesis" workshop in June; a year-long visitor program for young string theorists.

An article featuring some of the activities of the MCTP appeared in the Spring 2002 issue of the LS&A Magazine.

In September the proceedings of the MCTP Inaugural Conference "2001: A Spacetime Odyssey" were published by World Scientific.

Since its inception, MCTP members have produced 169 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 G.

We welcomed four new Full Members this year: Carl Akerlof, Steve Mrenna, Greg Tarle, and James Wells. There are currently 58 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 54 Associate Members from an even more diverse list of departments within and without Michigan. The membership list is given in Appendix D.

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 the actual budget for fiscal 2001–2002 (Appendix A), as well as projected budgets for 2002–2003 and 2003–2004. The Director's state-of-the-center summary is delivered annually at the Winter General Meeting. They are available on the web at: http://www.umich.edu/~mctp/membership.html

At the end of this year, Executive Committee member Ratin Akhoury (Particle theory) will be stepping down to be replaced by Jim Liu, as will Katie Freese (Astrophysics, Cosmology and Relativity) to be replaced by Gus Evrard. I would like to take this opportunity to thank Ratin and Katie for their helpful advice and hard work during the initial start up of the MCTP and to welcome aboard Jim and Gus.

Last but not least: Congratulations to MCTP secretary Angie Yerks, who has been selected by the LSA Staff Spotlight Committee to be spotlighted on the exemplary service she provides for the MCTP and how she is always going above and beyond the call of duty. An article about her and a photograph will appear on the LSA Staff Spotlight website to showcase her accomplishments.

1.2 Major external funding

The MCTP has continued with major external funding: a $900,000 Matching Funds Grant for High Energy Theory 2001–2005 from the DOE (PIs Michael Duff, Gordon Kane and Myron Campbell). These MCTP matching funds (denoted Task T) are separate from, and in addition to, the regular high energy theory DOE grant (denoted Task G).

An MCTP sponsored proposal for "Fronts, Fluctuations and Growth" has been approved by NSF for $216,000 for 2002–2005 (PIs Charlie Doering, Joseph Conlon, Len Sander, Peter Smereka and Bob Ziff). The MCTP is providing $160,000 in cost-sharing in the form of graduate student support.

In December, the Director of the MCTP made a presentation to the LS&A Development Office with a view to securing private donations. A glossy brochure is also planned.

2 Fiscal year: 2002–2003

2.1 Conferences and workshops

The MCTP organized five workshops during the period July 2002-June 2003, covering topics ranging from string theory to quantum computing:

"Perspectives in Decoherence Control and Quantum Computing" workshop, August 2002
"Time-Dependent Backgrounds in String Theory" workshop, March 2003
"QCD and Strings" workshop, April 2003
"Great Lakes Cosmology" workshop, May 2003
"Baryogenesis" workshop, June 2003

2.2 Colloquia

In keeping with its interdisciplinary mission, the MCTP hosts not-so-technical Colloquia designed to help us learn more about what our colleagues in other fields are doing. Coffee and cookies are served beforehand. The following were delivered over the last year:

"Quantum Gravity With a Positive Cosmological Constant",
Lee Smolin (Perimeter Institute, Waterloo), Tuesday, May 20, 2003.

"The Birth of Flight Control: Flight Testing with the Wright Brothers",
Gareth D. Padfield, James Bibby Professor of Aerospace Engineering (The University of Liverpool, UK), Friday, May 2, 2003.

"Laws of Nature in Physics and Philosophy",
Jessica M Wilson (University of Michigan), Tuesday, April 22, 2003.

"Exactly solvable models of networks and their applications",
Mark Newman (Department of Physics and Center for the Study of Complex Systems, University of Michigan), Tuesday, November 12, 2002.

"Comics, Art and Science: Telling stories with pictures (that don't move)",
Jim Ottaviani (University of Michigan Library), Tuesday, October 1, 2002.

2.3 Visitors

The MCTP aims to provide an attractive enviroment for visitors, ranging from short term to long term stays. The visitor program has been especially active in the past year, leading to added visibility of the center's activities.

String and M-theory:
Vijay Balasubramanian (UPenn), March 31 – April 11, 2003
Cliff Burgess (McGill), January 31 – February 1, 2003
Neil Constable (MIT), February 23 – March 8, 2003

Ben Craps (Chicago), December 1–7, 2002
Mirjam Cvetic (UPenn), October 1–3, 2002
Eric Gimon (IAS), April 28 – May 9, 2003
Jaume Gomis (Caltech), March 17–21, 2003
Rahmi Guven (Bogazici University), April 15 – May 31, 2003
Chris Herzog (KITP), March 17 – March 27, 2003
Matt Kleban (Stanford), September 8–15, 2002
Martin Kruczenski (Perimeter Institute), February 2–15, 2003
Hong Liu (Rutgers), October 6–12, 2002
Jianxin Lu (USTC, China), February 1-28, 2003
Alex Maloney (Harvard), February 3–9, 2003
Emil Martinec (Chicago), October 3–4, 2002
Samir Mathur (Ohio State), September 4–7, 2002
Emil Mottola (LANL), March 6–8, 2003
Asad Naqvi (UPenn), November 4–15, 2002
Carlos Nunez (Cambridge), April 21 – May 9, 2003
Lori Paniak, 2001–2003
Andrei Parnachev (Chicago), January 21–23, 2003
Malcolm Perry (Cambridge), September – December 2003
Chris Pope (Texas A&M), May 5–16, 2003
Eliezer Rabinovici (Jerusalem), March 30 – April 7, 2003
Ergin Sezgin (Texas A&M), May 4–18, 2003
Mark Spradlin (Princeton), September 12–20, 2002
Kelly Stelle (Imperial College), April 13 – May 4, 2003
Seiji Terashima (Amsterdam), October 1–14, 2002
Diana Vaman (Princeton), February 2–15, 2003
Cosmas Zachos (Argonne), October 11–12 , 2002

Particle Phenomenology:
Kaustubh Agashe (Johns Hopkins), December 4–7, 2002
Pierre Binetruy (Paris), February 3–8, 2003
Hooman Davoudiasl (IAS), November 12–24, 2002
Steve King (University of Southampton), March 24–28, 2003
Pyungwon Ko (KAIST), September 2002 – August 2003
Chris Kolda (Notre Dame), bi-weekly in Fall 2002

Condensed Matter Physics/AMO:
Daniel ben-Avraham (Clarkson University), October 16–21, 2002
Carl Mueller (University of Rochester), January 7–14, 2003
Igor Sokolov (Humboldt Universitat zu Berlin), September 9–29, 2002

2.4 Postdoctoral fellows

Brent Nelson (interface of particle physics and astrophysics) and Vladimir Malinovsky (coherent control of quantum dynamics) continued for a second year.

2.5 Graduate student fellowships

Part of our mission is the education of graduate students in theoretical physics and related mathematical sciences. The following students were awarded MCTP fellowships for 2002–2003:

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

2.6 Undergraduate research scholars

The MCTP 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 offers 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 415 project—UM majors

The proposal should contain:

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

It would also be helpful to include 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. Proposals may be submitted to Jean Krisch, either by email (jkrisch@umich.edu) or placed in her mailbox.

The successful applicants in fiscal 2002–2003 were:

G. Ghoshal (Sander)
A. Kimball (McKay)
B. Kelly (McKay)
J. Racusin (McKay)
M. Lamarca (Riles)

2.7 Successful proposals

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

COMPUTING

Computing (Computing Committee) MCTP Computer Manager	$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)	$17,920
"Time-Dependent Backgrounds in String Theory", April 2003 (Einhorn, Larsen)	$20,000
"QCD and Strings", May 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
Workshops total	$98,920

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
H. Krishnamurthy, 2 weeks (Moukori)	$2,775
C. Bourbonnais, 2 weeks (Moukori)	$2,775
Visitors total	$91,600

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
Graduate student fellowships total	$75,300

UNDERGRADUATE RESEARCH

G. Ghoshal (Sander)	$1850
A. Kimball (McKay)	$1850
B. Kelly (McKay)	$1850
J. Racusin (McKay)	$1850
M. Lamarca (Riles)	$1850
Undergraduate research total	$9,250

PUBLICATIONS CHARGES

(Freese, Lewis)	$1,000
FY04 Postdoctoral Position Ads	$1,995
Publications charges total	$2,995

TOTAL

$325,065

There were no postdoc openings this year.

2.8 Outreach and media coverage

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

Gordy Kane: Invited article "Anthropic Questions" in national journal of Phi Kappa Phi Honor Society, *The Forum*, Fall 2002 issue, and public talk as speaker at Phi Kappa Phi Honor Society Inauguration, Ann Arbor, on "Anthropic Questions", April 24, 2003.

Katie Freese: "The Dark Side of the Universe", Saturday Morning Physics lectures, University of Michigan, Ann Arbor, Michigan, April 5 and 12, 2003

Gordy Kane: "From before the big bang to our audience tonight", Public talk in conjunction with the NASA traveling exhibit "Cosmic Questions", Midland Center for the Arts, April 10, 2003.

Fred Adams: Ann Arbor District Library lecture series "Booked for Lunch", Main Library Branch, Ann Arbor, Michigan, April 2003.

Gordy Kane: Public talk, "Effective Theories and Emergence", Invited remarks for the University of Michigan Program "Case Studies in Emergence", March 7, 2003.

Fred Adams: Keynote Speaker for Annual Day, "Expanding your Horizons", Greenhills High School, Ann Arbor, Michigan, February 2003.

Fred Adams: Public Lecture, Greenhills High School, Ann Arbor, Michigan, February 2003.

Fred Adams: Public Lecture, Science Research Club, University of Michigan, Ann Arbor, Michigan, February 2003.

Fred Adams: Public Lecture, Borders Books, Ann Arbor, Michigan, November 2002.

Gordy Kane: "What would Paul Dirac think of Particle Physics Today and Supersymmetry", Invited Talk, Dirac Centennial, Baylor University, October 2002.

Michael Duff: The Asim Barut Memorial Lecture, "History on the Brane", Bogazici University, Istanbul, October 2002.

Fred Adams: "Future of the Universe", Public Lecture, State Library, Belgrade, Yugoslavia, October 2002.

Fred Adams: "Origins of Existence: How Life Emerged in the Universe", 2002, (New York: The Free Press), 256 pages, ISBN: 0–743–21262–2.

Fred Adams: Public Lecture for the MENSA Society of Southeastern Michigan, Southfield, Michigan, June 2002.

Michael Duff: Public Lecture "The Eleven Dimensional Universe of M-theory", University of Oxford, June 2002.

In addition, members of the MCTP enjoyed the following media coverage.

Gordy Kane: Diane Rehm national show, NPR, on multiple universes, Oct 31, 2002.

Carl Akerlof: Todd Mundt Show: Nationally syndicated NPR talk show. Akerlof tells Todd about the hypernova that exploded two billion years ago, and how the group ROTSE (Robotic Optical Transient Search Experiment) is learning more about it. See also Science Letter, April 28, 2003; ASTROPHYSICS: Two billion-year-old explosion of giant star observed; Vancouver Sun (British Columbia, Canada), April 15, 2003 Astronomers watch huge burst as star explodes; United Press International, April 5, 2003 Saturday, 623 words, Scrambling to study a 'hypernova' (Phil Berardelli); AScribe Newswire, April 4, 2003 It's a Nova . . . It's a Supernova . . . It's a Hypernova.

Michael Duff: Die Zeit, January 2, 2003 Das Weltall schwankt (Max Rauner).

Michael Duff: New York Times, December 31, 2002 E and mc2: Equality, It Seems, Is Relative (Dennis Overbye).

Franco Nori: Technology Review News, December 2002 Design links quantum bits (Eric Smalley). Science and Technology Trends, December 2002 RIKEN Proposes a New Type of Superconducting Quantum Computer. EE Times, November 22, 2002 Superconducting junctions eyed for quantum computing (Colin Johnson).

Franco Nori: AScribe – The Public Interest Newswire, November 2002 & NewsWise, November 2002 & Nikkei, January 6, 2003 & Nature Materials, November & 2002 (Cover) & Japan Industrial Journal. Japan Industry News, October 24, 2002 & Daily Industrial Newspaper (The Nikkan Kogyo Shinbun), October 24, 2002. On "Experimentally-realizable devices for controlling the motion of magnetic flux quanta in anisotropic superconductors, S. Savelev and F. Nori (Nature Materials, 1, 179, 2002). Electronics Weekly, November 13, 2002 US and Japanese scientists control magnetic flux quanta. Science News (in Japan), November 8, 2002. On Scalable Quantum Computing with Josephson junction Qubits, J.Q. You, J.S. Tsai, and F. Nori (Physical Review Letters, 89, 179, 2002). Nature Materials. News and Views, 143, 2002. Controlling the Motion of Quanta. November 6, 2002 Stories of modern science, from UPI (United Press International) (Ellen Beck). Electronics Weekly, November 6, 2002 Quantum qubits. The University of Michigan News and Information Services, November 4, 2002 Researchers propose breakthrough devices to control the motion of magnetic fields. Kansas City Star, November 2, 2002 Thoughtful about uploading (Bill Tammeus). Forum fur Wissenschaft, Industrie und

Wirtschaft, November 2002. Innovations Report. Supercomputing online, October 23, 2002 Paper Discusses Circuitry for Quantum Computing. Forum fur Wissenschaft, Industrie und Wirtschaft, October 2002 Innovations Report.

Michael Duff: The Daily Telegraph, August 7, 2002. This (Dirac) is Britain's answer to Einstein but have you heard of him? (Graham Farmelo).

Katie Freese: New Scientist, August 3, 2002 Will Life Last Forever?

Fred Adams: Discovery Channel, June 2002 Unfolding Universe.

Tim McKay: LS&A Magazine, Spring 2002 All sky, all the time.

Michael Duff: LS&A Magazine, Spring 2002 The theory formerly known as strings.

Gordy Kane: LS&A Magazine, Spring 2002 UM's Gordon Kane bets Stephen Hawking.

Marty Einhorn: Awarded Guggenheim Fellowship, New York Times, April 2003.

Michael Duff: "The theory formerly known as strings" in special issue of Scientific American: *The edge of physics*, February 2003.

Fred Adams: The "Unfolding Universe" on the Discovery Channel, June 13 10:00 pm , June 14 1:00 AM , June 16, 4:00 pm, 2002.

2.9 External funding

The MCTP has continued with major external funding: a $900,000 Matching Funds Grant for High Energy Theory 2001–2005 from the DOE (PIs Michael Duff, Gordon Kane and Myron Campbell).

P. Berman and C. Monroe, FOCUS Group, U of M, "Workshop on Decoherence Control and Quantum Computing", $15,000.

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

2.10 The 2002–2003 budget (projected)

Time period: 1 July 2002 to 30 June 2003

Income:

LS&A	$400,000
Physics	$50,000
Surplus from 2001–2002	$48,943
TOTAL	$498,943

Expenditure:

Director release time	$9,000
Secretary at 40%	$16,128
Computing	$37,000
Cost sharing	$10,000
Visitor program	$101,312
1.5 MCTP Postdoctoral fellows	$76,000
Postdoctoral travel	$6,000
7 MCTP Graduate Student Fellowships	$75,300
5 MCTP Undergraduate Research Scholars	$9,250
"Quantum Computing" workshop	$17,920
"Time-Dependent" workshop	$20,000
"QCD and Strings" workshop	$30,000
"Cosmology" workshop	$21,000
"Baryogenesis" workshop	$10,000
Workshop video taping	$5,000
Publication charges	$2,995
Office furniture	$3,074
Office supplies	$2,855
TOTAL	$452,834

SURPLUS $46,109

A further $30,000 was encumbered for the "Quantum Applications Symposium", Summer 2004.

3 Fiscal Year: 2003–2004

3.1 Conferences and workshops

The MCTP will hold the following workshops in 2003–2004:

"The Dark Side of the Universe", Spring 2004
"String Phenomenology 2004" international conference, August 1–6, 2004
"Quantum Applications Symposium", Summer 2004

The center plans to organize one additional workshop, in timely response to important theoretical developments in the forthcoming year.

3.2 Graduate student fellowships

The following students will receive fellowships in 2003–2004:

Rui Zhang (Berman)
Andrew Eppig (Mrenna)

In addition, as noted below, the committee approved $159,204 over the period 2003–2006 to support graduate students on the NSF grant "Fronts, fluctuations and growth".

3.3 Undergraduate research scholars

The following undergraduates will receive MCTP research placement:

Joseph Paul (Tomozawa)
Sammeer Walavalkar (Krisch/Neal)
Jacob Bourjaily (Krisch/Neal)
Michael Borysow (Krisch/Neal)
Chris Hayward (Krisch/Neal)
Sara Kasun (Evrard)
Erwin Lau (Mckay)

Additional details on the undergraduate research program may be found in section 2.6.

3.4 Postdoctoral Fellows

The MCTP received over 500 applications for the postdoctoral positions advertised in Physics Today.

This year the Executive Committee (EC) decided to fund three MCTP postdoc positions, one each in the three areas

(*i*) high energy/string theory,

(*ii*) astrophysics/cosmology,

(*iii*) interdisciplinary/statistical/optics/nonlinear/etc.

Position (*i*) has been filled by Jason Kumar from UC San Diego, and position (*ii*) has been filled by Dejan Stojkovic from the University of Alberta, and position (*iii*) has been filled at 50% by Dr. Nikola Petrov, an Assistant Professor in the UM Department of Mathematics (with 1–1 teaching duties).

The remaining 50% for position for (*iii*) will be spent on a focused visitor program in condensed matter, interdisciplinary, statistical, optical, nonlinear, etc. physics. The idea here is to bring in several visitors (each for about a week) to speak to and interact with MCTP members and the broader UM research community. The MCTP Executive Committee invites suggestions for particular individuals to be invited next year with these funds. These suggestions for visitors should be sent to Bob Savit (savit@umich.edu) who will collect and pass the suggestions to the EC.

3.5 Successful proposals

The Committee received 25 proposals for various activities and, after careful consideration, has recommended the following for approval by the Physics Department:

COMPUTING

Computing (Computing Committee)	
MCTP Computer Manager	
	$37,000

VISITORS

Visitor program for young string theorists	
(Larsen, Liu, Pando-Zayas)	$20,000
AMO/Condensed Matter visitor program	$29,000
Laura Merseni, two weeks (Freese)	$1,890
Zenbing Chen, 6 months (Duan)	$8,250
Christophe Grojean, 1 year 25% (Wells)	$15,000
Geraldine Servant, 1 year @ 25% (Wells)	$15,000
Estaban Moro, 1 month (Doering)	$3,780
Giovanni Rossi, 1 month (Sander)	$5,180
Cesar Escalante, 1 year 33% (Freese)	$9,000
Visitors total	$107,100

COST SHARING

"NSF Grant: Fronts Fluctuations and Growth"	
(Doering, Conlon, Sander, Smereka, Ziff)	
$51,009 less indirect costs	$38,000

In addition the committee approved $53,144 for the fiscal year 2004–2005 and $55,271 for the fiscal year 2005–2006. These funds will support graduate students.

WORKSHOPS

"Quantum Applications Symposium", August 2004	
(Monroe)	$15,000
"The Dark Side of the Universe", Spring 2004	
(Evrard, Freese, McKay, Tarle)	$45,000
"String Phenomenology 2004", 1–6 August 2004	
(Kane, Wells)	$5,000
"TBA", (Duff)	$25,000
Workshops total	$90,000

In addition the committee approved another $15,000 for the Quantum Applications Symposium and another $40,000 for Strings Phenomenology 2004 for fiscal year 2004–2005.

GRADUATE STUDENTS

Rui Zhang (Berman)	$14,000
Andrew Eppig (Mrenna)	$2,196
Graduate students total	$16,196

In addition, as noted above, the committee approved $159,204 over the period 2003–2006 to support graduate students on the NSF grant.

UNDERGRADUATE RESEARCH

Joseph Paul (Tomozawa)	$1925
Sammeer Walavalkar (Krisch/Neal)	$1925
Jacob Bourjaily (Krisch/Neal)	$1925
Michael Borysow (Krisch/Neal)	$1925
Chris Hayward (Krisch/Neal)	$1925
Sara Kasun (Evrard)	$1925
Erwin Lau (Mckay)	$1925
Undergraduate research total	$13,475

TOTAL

$301,771

3.6 External funding

The MCTP has continued with major external funding: a $900,000 Matching Funds Grant for High Energy Theory 2001–2005 from the DOE (PIs Michael Duff, Gordon Kane and Myron Campbell).

An MCTP sponsored proposal for Fronts, Fluctuations and Growth has been approved by NSF for $216,000 for 2002–2005 (PIs Charlie Doering, Joseph Conlon, Len Sander, Peter Smereka and Bob Ziff). The MCTP is providing $160,000 in cost-sharing in the form of graduate student support.

3.7 The 2003–2004 budget (projected)

Time period: 1 July 2003 to 30 June 2004

Income:

LS&A	$400,000
Physics	$50,000
Surplus from 2002–2003	$46,109
TOTAL	$496,109

Expenditure:

MCTP Brochure	\$10,000
Director release time	\$9,000
Secretaries	\$33,880
Computing	\$37,000
Cost sharing	\$38,000
Visitor programs	\$107,100
2.5 MCTP Postdoctoral Fellows	\$141,750
Postdoctoral travel	\$5,000
2 MCTP Graduate Student Fellowships	\$16,196
7 MCTP Undergraduate Research Scholars	\$13,475
"Quantum Applications" symposium	\$15,000
"String Phenomenology 2004" conference	\$5,000
"Dark Matter" workshop	\$45,000
"Other workshop"	\$25,000
Office furniture/supplies	\$4,000
TOTAL	\$505,401
DEFICIT \$9,292	

4 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 Actual budget for fiscal year: 2001–2002

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

The MCTP also benefited from cost sharing on conferences ($22,500) and visitors ($51,000).

Expenditure:

Grant Expenditure	$30,000
Construction	$71,355
Director release time	$9,000
Secretary at 40%	$13,600
Computer manager	$36,870
Computing	$4,316
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

SURPLUS $48,943

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

B Proposal

The original MCTP proposal may be found on the web:
http://www.umich.edu/~mctp/membership.html

C Bylaws

The MCTP bylaws may be found on the web:
http://www.umich.edu/~mctp/membership.html

D Membership list

D.1 Full members

C. Akerlof (Physics)
F. Adams (Physics)
R. Akhoury (Physics)
P. Berman (Physics)
A. Bloch (Mathematics)
J. Bregman (Astronomy)
P. Bucksbaum (Physics)
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)
S. Mrenna (Fermilab)
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)
G. Tarle (Physics)
A. Tkachenko (Chemical Engineering)
Y. Tomozawa (Physics)
A. Uribe (Mathematics)
J. Vandermeer (Biology)
M. Veltman (Physics)
J. Wells (Physics)
D. Williams (Physics)
A. Wu (Physics)
E. Yao (Physics)
R. Ziff (Chemical Engineering)
M. Zochowski (Physiology)

D.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)
A. Buchel (Physics)
J. Chapman (Physics)
Y. Chushak (Chemistry)
J. Davis (Physics)
M. Deutsch (Physics)
T. Donohue (Physics)
B. Dubetsky (Physics)
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)
J. Lu (Physics)
S. Malinovskava (FOCUS)
V. Malinovsky (Physics)
D. Manna (Physics)
F. Marchesoni (Physics)
D. Maxwell (Romance Languages and Literature)
R. McNees (Physics)
M. Mbonye (Physics)
L. Moffatt (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)
C. Search (Physics)
Q. Shi (Chemistry)
P. Smereka (Mathematics)
N. Soparkar (Electrical Engineering and Computer Sciences)
K. Tobe (Physics)
C. Warren (Physics)
S. Wen (Physics)
W. Zhou (Physics)

E Postdocs, graduate students and long-term visitors

E.1 Postdocs

A. Buchel
V. Malinovsky
R. McNees
B. Nelson
Q. Shi

K. Tobe

E.2 Graduate students

J. Baker
A. Batrachenko
J. Bialek
J. Davis
M. Franke
V. Huang
M. Lewis
D. Li
Y. Li
D. Manna
L. Moffatt
A. Pawl
C. Search
C. Warren
S. Wen
W. Zhou

E.3 Long-term visitors

DaeKil Park (Korea) April 2001 – January 2003
Lori Paniak (Princeton) July 2001 – July 2002
Roberto Vega (Southern Methodist University) August 2001 – August 2002
Sir Michael Atiyah (University of Edinburgh) April 2002
Jianxin Lu (USTC, China) January 1 – May 31, 2003

E.4 Computer manager

A. Batrachenko

E.5 Secretary

A. Yerks

F Committees

F.1 Executive Committee of the MCTP

M.J. Duff (Director)
R. Akhoury (Particle Theory)
C. Doering (Interdisciplinary)
K. Freese (Astrophysics/Relativty/Cosmology)

B. Savit (Condensed Matter/AMO/Biophysics)

F.2 Computing

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

F.3 Diversity

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

F.4 Facilities

A. Akhoury (Chair)
P. Berman

F.5 Undergraduate research

J. Krisch (Chair)
F. Nori

G 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

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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

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

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MCTP-00-23 G. Mark Voit, August E. Evrard, Greg L. Bryan, Confusion of Diffuse Objects in the X-ray Sky

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