Name of Center: Michigan Center for Theoretical Physics

director: Professor Gordon Kane
department ID: 184500
location/address: 3444B Randall Laboratory, Department of Physics, 450 Church Street, Ann Arbor MI 48109-1040
url for mctp website: http://www.umich.edu/~mctp/

"To summarize, from many decades’ experience in our field, MCTP has brought back the glory days of UM Physics and I fervently hope that this initial period’s success will be continued in the next cycle you so richly deserve."

Stanley Deser, Ancell Professor of Physics
Brandeis University and Member, National Academy of Sciences

"As far as I can see, the very successful activities of the Center put it on a par with such world renowned programs as the KITP at Santa Barbara, the Newton Institute at Cambridge and the Yukawa Institute for Theoretical Physics in Kyoto."

Baruch Meerson, Professor of Physics
Racah Institute Hebrew University of Jerusalem

"The MCTP is an exciting and stimulating resource for physics, mathematics and science in general at the University of Michigan that greatly benefits students and faculty. ... I have found that in visits to other universities people really know about MCTP and that this has put Michigan theoretical science on the map in a way that individual departments here cannot do…"

Anthony Bloch, Professor of Mathematics
University of Michigan
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1. What is the mission of the Center?

The Michigan Center for Theoretical Physics (MCTP) is an organization based in the Physics Department of the University of Michigan whose primary aim is to promote excellence in theoretical physics research in the broadest sense, with significant focus on interdisciplinary applications and methods, through a program of workshops and conferences, seminars, visitor programs and collaborative research. MCTP aims to educate graduate and undergraduate students in theoretical physics and to communicate its activities to the general public through public lectures, science cafes, and other outreach activities. By being a leading center for theoretical physics on UM campus, MCTP serves to strengthen a world-class research community based in Ann Arbor and to stimulate a culture of scientific excellence and technological strength in Southeastern Michigan.

2. How do you measure the success of the Center in fulfilling its mission?1

We itemize below a number of specific measures that are indicators of success. Broadly speaking, MCTP is very successful in providing a strong planning and support infrastructure for workshops/conferences, visitors and other engagement activities run by its members, in addition to providing funding for such activities. Organizers of an approved workshop provide core elements – subject, dates, event, outline and speaker/participant list – and the rest is largely taken care of. The high, and often prohibitive, level of effort required to run a successful workshop is handled by MCTP staff, allowing the organizers to focus on their research agenda. The marginal effort needed for any workshop is much smaller than without the infrastructure.

a) MCTP funding from LSA has leveraged considerable additional funding, both generally and for specific activities. The largest is a matching grant from the Department of Energy (DoE) for those activities in particle physics, cosmology, astrophysics and related areas which has brought in additional funding of $1.8 Million so far. This peer-reviewed grant demonstrates strong international respect for MCTP activities. DoE funds are matched at 50% of the University support level, and therefore will be reduced in proportion to any University reductions. Other funding leveraged by MCTP comes to about $500,000; a detailed list of these through early 2008 is on the Questions web site appendix to this report (URL on cover page).

b) MCTP has established a Visiting Committee, composed of 18 prominent business and community leaders from Southeastern Michigan, who have agreed to help strengthen the financial foundations of MCTP and to promote its goals. Their endorsement is a strong indicator of quality and of present and anticipated impact. The Questions web site contains a list of their names and positions.

c) MCTP has played a powerful role in successful recruiting of young faculty. On the Questions web site we include a letter from seven Physics and one Astronomy hire stating that MCTP played a large role in their decision to come to Michigan. The

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1 We apologize for this answer being longer than half a page. Since this answer may be very important for the future of MCTP, we thought it was important to make it comprehensive.
college has approached MCTP in the past to offer Full Membership to senior people to help recruiting.

d) Over 80 faculty, in 20 University units have become Full Members of MCTP, showing considerable interest. All have PhDs and do research in theoretical physics and related areas. Requests for support of activities from full members have exceeded the available funds by at least a factor of 1.5 each year.

e) Over 2000 scientists from all continents have come to Ann Arbor to participate in 45 MCTP programs. Such scientists recognize first-hand the resources and strengths here, which facilitates recruitment at all levels, but especially for young scientists. They encourage others to come here and are more likely to send their top students and post docs here.

f) MCTP provides support for a shared, high-performance compute cluster (Legato) used by dozens of researchers across three LSA departments.

g) So far 721 publications have been prepared that carry an MCTP number.

h) The extra activity from the workshops and meetings leads to research ideas that strengthen proposals, thereby increasing the likelihood of funding. Reviewers who have been here and seen activity are more likely to give favorable reviews.

i) As more departments have begun to take active advantage of MCTP’s infrastructure, they have agreed to help support MCTP activities. Mathematics, Astronomy, and Philosophy have already committed support, and discussions are being initiated with other departments.

j) In August 2009, discussions were initiated about having an outside review of MCTP’s achievements and activities and goals. This has been approved by the Physics Department and is being brought to the College for approval.

3. When was the Center established?

The Michigan Center for Theoretical Physics was established in September 2000 by former Dean Shirley Neuman.

4. Does the Center have identifiable space devoted exclusively to its use?

Offices (except for 3444) were renovated specifically for the Center when it was founded (one was traded for another after the founding).

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<th>Dept ID</th>
<th>Dept Description</th>
<th>Dept Effdt</th>
<th>Location</th>
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5. To whom does the director of the Center report? What unit(s) oversees the budget and staff of the Center?

The MCTP Director reports to the Physics Department Chair, and to the LSA Dean. The Physics Department and its Business Office oversee the budget and the Center’s staff.

6. Currently, how many faculty members are active participants in the Center? List the current executive committee members and their affiliations.

The MCTP currently contains 89 full members, comprised of 76 active and 13 emeritus faculty members. A directory of Full and Associate MCTP members can be found at the MCTP web site (http://www.umich.edu/~mctp/directory.html).

The MCTP Executive Committee consists of four full members covering separate areas. Current members (area; department) are:

- Prof. Alejandro Uribe (Interdisciplinary; Mathematics)
- Asst. Prof. Dragan Huterer (Astrophysics/Cosmology/Relativity; Physics)
- Asst. Prof. Aaron Pierce (Particle Theory; Physics)
- Assoc. Prof. Michal Zochowski (Condensed Matter/AMO/Biophysics; Physics)

There are also three Associate Directors for the Center; Associate Director for Budget and Planning (Prof. August Evrard, Physics), Associate Director for Outreach (Prof. Katherine Freese, Physics), and Associate Director for Research (Prof. Leonard Sander, Physics).

7. How many faculty members receive salary directly from the Center or from grants that run through the Center?

The MCTP Director receives compensation each year for Director administrative differential. There are no faculty salaries paid from the Center or from any grants that run through the Center.

8. What is the staffing level within the Center?

Please see excel spreadsheet.

9. Indicate any honors/awards that have been given to the Center

Not applicable. There are no awards given to such Centers in Physics.

10. Please provide a 3-year view of total expenditures by fund (for FY2007 – FY2009)?

Please see excel spreadsheet. It is difficult to adequately represent the Center’s actual annual income and expenditures by fund level due to multiple sources in some cases. We include actual income and expenditure statements for fiscal years 2007-2008 and 2008-2009 and a projected income and expenditures statement for fiscal year 2009-2010 for
clarification, as well as fund based information where available. Because of renewal uncertainties, particularly at the three year reviews, expenditures were treated conservatively. Since commitments often need to be given long ahead of time, the expenditures have been allowed to fluctuate.

11. How much student support is provided through the Center?

The MCTP supported students at a level of $129,000 in fiscal year 2009.

12. How would the Center adjust activities with 10% more General Fund support or 10% less General Fund support?

As explained briefly in the answer to Question 2, the infrastructure and such support are essential to the functioning of the Center, and could not be reduced without harming the effectiveness of the Center (nor improved significantly with a small increase). Therefore a 10% increase would be used to improve workshops and meetings, and to support an additional workshop or meeting. If the budget were decreased 10% it would mean cancelling one or two workshops of the about eight funded annually, and/or reducing the support for others. That would reduce their quality since they were already funded below an optimal level.