

Final Technical Report

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Award Recipient

Regentss of the University of Michigan
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Project Title

High Energy Theory Workshops and Visitors at the Michigan Center for Theoretical
Physics FY15

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Period Covered

August 1, 2014 – July 31, 2015

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This award supported three activities:

- String/M-theory Compactifications and Moduli Stabilization, Ann Arbor, MI, September March 4-7, 2015
- The 4th MCTP Spring Symposium: Higgs physics in the Standard Model and Beyond, August 20-22, 2015
- Young High Energy Theory Visitor Program September 2014–May 2015

The String theory workshop was held from March 4-7, 2015 on the University of Michigan campus. Local organizers were Gordon Kane and Aaron Pierce. Piyush Kumar (Yale), Jim Halverson (KITP), Bobby Acharya (ICTP) and Sven Krippendorf (Oxford) served as external organizers. The meeting focused on the status of work to project 10 or 11 dimensional string/M theories onto our 4 spacetime dimensions (compactification). This is an area that has existed for three decades, and has recently been undergoing renewed activity and progress. New physics arises via compactification, with moduli fields that describe the sizes and shapes of the curled up dimensions, and how the physics that describes our world is described by the moduli fields and their quanta. The moduli have to be stabilized, i.e. have fixed values in the vacuum, or predictions of observables would not give definite values and be testable. At the same time, in some cases, particularly in M theory, stabilization leads to calculable supersymmetry breaking. The workshop had 31 participants, half from outside the U.S. Participants were encouraged to focus on predictions for recent and forthcoming data, particularly for Higgs physics and LHC and dark matter, rather than on the traditional approach of embedding the Standard Model particles and forces. Participants were enthusiastic about the value of the meeting, and people who were unable to come remarked soon after that they heard it was a successful workshop.

The Higgs boson symposium was locally organized by James Wells (chair), Aaron Pierce and Jianming Qian. Additional input in the early stages by Stefan Pokorski (Warsaw) who was unable to attend in the end. The workshop consisted of 22 talks from experts around the world, both theoretical and experimental. Experimentalists summarized the current state of knowledge of the Higgs boson and its variants. The theory talks ranged from technical calculations of Standard Model processes (Petrov, Wayne State), to speculative novel ideas such as the “relaxion” (Graham, Stanford). Continuous interactions among individuals with close, but not identical, expertise allowed researchers to go home and reflect on improvements to theoretical or phenomenological analyses.

The YHET visitor program invited weekly young visitors to the University of Michigan campus to present their work. This year 24 participants came under the program, with 17 of them receiving at least partial support for their visits.

Slides are available on line for talks provided by speakers for both workshops and the YHET visitor program on the MCTP website at: <http://mctp.physics.lsa.mctp.edu>