Final Technical Report

DOE Award Number
DE-SC0019187

Award Recipient
Regents of the University of Michigan
Ann Arbor, MI

Project Title
High Energy Theory and Cosmology Workshops at the Leinweber Center for Theoretical Physics at the University of Michigan

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Report date
October 9, 2019

Period Covered
August 1, 2018 – July 31, 2019

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As indicated in the proposal, this award partially supported two activities:

- DES Y3 workshop: "Probing Dark Energy Observations in the Nonlinear Regime"
- The 7^{th} LCTP Spring Sympoisum: Neutrino Physics

Funds were primarily used to support external participants

The workshop "Modeling Dark Energy Observations in the Nonlinear Regime", informally called the Dark Energy Survey (DES) Year-3 workshop, took place on Oct 15-19, 2018 at the University of Michigan. It included about 50 cosmologists - all DES members - from three continents. The goal of the workshop was to make concrete, quantifiable progress on the data analysis that will be a core component for the DES Year-3 release. The DES Y3 results, when completed, will produce world?s best constraints on dark matter and dark energy from a galaxy survey, and will also pave way for similar analyses from LSST, WFIRST and other major surveys in the 1-2 decades to come. The workshop, true to its name, primarily consisted of a number of parallel working sessions and hack-a-thons where progress was made on concrete tasks. Also of note were several comprehensive reviews of the status of different parts of the modeling/analysis pipeline. The workshop also served an important purpose of getting collaborators together to clarify and prioritize upcoming efforts, tasks and scientific goals. The primary local organizer was Dragan Huterer; Yuanyuan Zhang (Fermilab) and Michael Troxel (Ohio State) served as external organizers.

The 2019 Spring Symposium on Neutrino Physics was locally chaired by Josh Spitz (experiment) and James Wells (theory), and co-chaired by A. Friedland (SLAC), B. Shakya (UC Santa Cruz) and Sam Zeller (FNAL). Approximately 50 researchers participated in the symposium and about 25 talks were presented. The focus of the conference was interactions between theorists and experimentalists for future neutrino studies, and it was a very successful program. We had important interactions from experimentalists on the kinds if neutrino cross-section interactions are needed to get the most power of the data, and we had important interactions from theorists learning the sensitivities (energy resolutions, flavor resolutions, etc.) the different experiments have and will have in the future. Participants also were able to get a broad survey of many beyond the Standard Model signals that are possible and motivated within some extensions of the Standard Model, and even within the varieties of Standard Model theories, such as determining the different signatures of Dirac and Majorana neutrino mass scenarios.

Slides are available for many of the workshop's talks at
`https://sites.google.com/a/umich.edu/the-7th-lctp-spring-symposium-neutrino-physics/workshop-itinerary`