

Preface

When this volume of the Proceedings is published, the CERN Large Hadron Collider (LHC) will have started taking data, and a new era in high energy physics, as well as in science overall, has since begun. The depth of the LHC program in understanding the nature at such short space-time scales, its extent in exploring fundamental questions, the scope of the involvement in the community world-wide are all unprecedented. Revolutionary scientific progress is highly anticipated from the LHC experiments. The LHC will fully explore the Tera-scale physics and possibly beyond: the mechanism of the electroweak symmetry breaking, fermion masses, their flavor mixing and CP violation, new forces and strongly interacting dynamics, the nature of dark matter, larger unification of fundamental interactions, extended symmetries such as Supersymmetry and extra spatial dimensions, to name a few exciting possibilities.

In the recent years, we have also witnessed the major discoveries in the fields of cosmology and neutrino physics. The nature of dark energy, the origin of dark matter, and the cause of the inflation are all mysteries to uncover. The tiny neutrino masses, their large flavor mixing, and the nature of Dirac or Majorana type are all pressing issues to address.

The design of the TASI-2008 lectures reflects these upcoming developments in the field. There are four parts of the lectures:

- The Standard Model And LHC Phenomenology
- LHC Experimentation
- Advanced Theoretical Topics
- Neutrino Physics, Astroparticle Physics, And Cosmology

I feel deeply impressed by the balance of the contents, the coverage of the materials, the pedagogical nature of the presentation and the writing of the lecture notes, for which I am grateful to those dedicated lecturers. I believe that the students in TASI 08 must have learnt a lot from them. The Proceedings will also benefit other researchers in the related fields.

In closing, I would like to thank the TASI general Director, Prof. K.T. Mahanthappa for the enjoyable collaboration during TASI 08; Susan Spika and Elizabeth Price for their efficient secretarial help in making TASI 08 run smoothly; Tom DeGrand for organizing the mountain hikes that challenged our limitations and imagination; and my co-scientific Director Robin Erbacher for helping me putting the program together. TASI Schools thank the National Science Foundation, the Department of Energy and the University of Colorado for financial and material support. I would also like to thank the TASI Scientific Advisor Board to have invited me as one of the Scientific Program Directors, that gave me the opportunity to have worked with these leading physicists as lecturers, and also gave me the pleasure to have interacted with these motivated and talented young students, who are our future in taking high energy physics to a brand new stage.

Go LHC!

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