

Beyond the Standard Model after the first run of the LHC

Training Week
June 10-15, 2013

■ Nathaniel Craig (IAS Princeton)

Title: **The State of Supersymmetry after Run I of the LHC**

Abstract: In these lectures I will survey the state of supersymmetric extensions of the Standard Model in light of the current LHC data set. I'll begin by exploring the pre-LHC expectations for supersymmetry based on arguments of naturalness and minimality. I'll then present current limits on supersymmetric partners from both direct and indirect searches at the LHC, including the implications of the observed Higgs mass and couplings. Finally, I'll survey several broad classes of supersymmetric models that are consistent with current data and enumerate the most promising search strategies and model-building directions for the future.

■ David Poland (Yale University)

Title: **CFTs for Physics Beyond the Standard Model**

Abstract: In these lectures I will give an introduction to conformal field theories, emphasizing ideas and techniques connected to understanding to the role that scale-invariant dynamics could play in physics beyond the Standard Model.

■ Andrea Wulzer (Universita' Padova)

Title: **Composite Higgs: Principles and Applications**

Abstract: I will review the theoretical motivations for regarding the Higgs as a composite pseudo-Nambu-Goldstone boson, and I will illustrate the effective field theory methodologies that are used to derive the generic phenomenological implications of this idea. The main tools are the "SILH" (or large- N_c) power counting and the general CCWZ sigma-model construction, that find interesting applications in many other contexts besides Composite Higgs. As applications, I will compute the deviations from the SM of the composite Higgs couplings and I will discuss the generation of the Higgs mass. Finally, I will describe the most promising LHC signatures of the scenario and I will quantify the impact of the present experimental searches.

Program

Monday, June 10

11:00 AM - 12:45 AM (Craig)

3:00 PM- 4:45 PM (Poland)

Tuesday, June 11

11:00 AM - 12:45 AM (Wulzer)

3:00 PM - 4:45 PM (Craig)

Wednesday, June 12

11 AM - 12.45 AM (Poland)

3:00 PM - 4:45 PM (Wulzer)

Thursday, June 13

11 AM - 12.45 AM (Craig)

3:00 PM - 4:45 PM (Poland)

Friday, June 14

11:00 AM - 12:45 AM (Wulzer)

(Each lecture will be 45+45 minutes with 15 minutes break)