Contribution ID: **311** Type: **Oral Presentation**

Study of SU(2) gauge theories with multiple Higgs fields in different representations

Monday, August 8, 2022 3:00 PM (20 minutes)

We study two different SU(2) gauge-scalar theories in 3 and 4 spacetime dimensions. Firstly, we focus on the 4 dimensional theory with 2 sets of fundamental scalar (Higgs) fields, which is relevant to the 2 Higgs Doublet Model (2HDM), a proposed extension to the Standard Model of particle physics. The goal is to understand the particle spectrum of the theory at zero temperature and the electroweak phase transition at finite temperature. We present exploratory results on scale setting and the multi-parameter phase diagram of this theory.

On the other hand, we are interested in the 3 dimensional SU(2) theory with multiple Higgs fields in the adjoint representation, that can be mapped to cuprate systems in condensed matter physics which host a rich phase diagram including high-Tc superconductivity. It has been proposed that the theory with 4 adjoint Higgs fields can be used to explain the physics of hole-doped cuprates for a wide range of parameters while the theory with 1 real adjoint Higgs field would describe the physics of electron-doped cuprates. We show exploratory results on the phase diagram of these theories.

Primary author: SARKAR, Mugdha (NCTS/NTU)

Co-authors: HOU, George W.-S. (NTU Taiwan); HIRAGUCHI, Atsuki (NYCU Taiwan); TELO, Guilherme (IFIC - Valencia); LIN, C.-J. David (National Yang Ming Chiao Tung University); JANSEN, Karl (DESY); RAMOS, Alberto (University of Valencia - IFIC); KAO, Ying-Jer

Presenter: SARKAR, Mugdha (NCTS/NTU)

Session Classification: Theoretical Developments

Track Classification: Theoretical Developments and Applications beyond Particle Physics