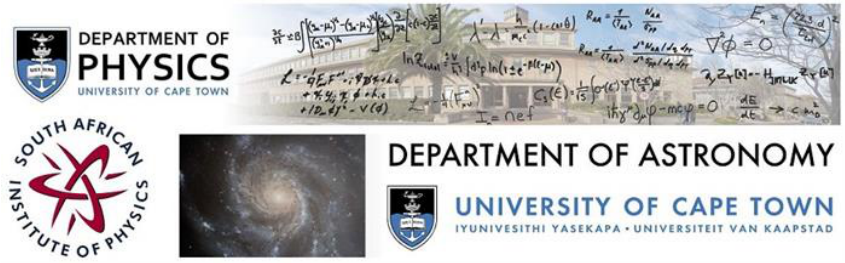

Contribution ID: **449** Type: **Oral Presentation**

Phenomenology of additional scalar bosons at the LHC

Friday, 8 July 2016 15:00 (20 minutes)

Abstract content
   (Max 300 words)
Formatting &
Special chars

Following arXiv: 1506.00612, an effective field theory approach has been introduced to understand the distortion of the Higgs p_T and other excesses observed in Run I LHC data by considering two hypothetical particles H and χ, with the masses $2m_h < m_H < 2m_t$ and $m_\chi < m_h/2$ where m_h is mass of the SM Higgs, h and χ is considered as a dark matter candidate. A fit with the observed p_T spectrum of the Higgs boson at the LHC and a statistical combination of the different relevant processes results $m_H = 272^{+12}_{9}$˜GeV with $m_\chi \approx 60$˜GeV. In this study we introduce a real scalar S with mass m_h
$lesssimm_S$
$lesssimm_H - m_h$ in a effective theory to explain large branching ratios of $H \to h\chi\chi$. By introducing an intermediate S further simplifies the coupling structure with comparatively less branching fraction.
Further we introduce a two Higgs doublet model (THDM) where we assume the particle spectrum of the THDM, h as the SM Higgs, H as heavy scalar as in the effective theory, A as a CP-odd scalar with $m_A > 2m_t$ and charged Higgs $H^\pm$ with $m_H^\pm < m_A$. A proper theory with THDM in addition with S and χ as a real scalar assuming χ as a dark matter candidate is formulated to describe associated phenomenology with these particles. An explanation in multi-lepton final states with same-sign leptons expected to be observed in different processes $pp > H > hS, h, S \to W^+W^-$; $pp > H^-t + h.c$ with possible decay of $H^\pm$ and t-quark in leptonic final states. A full analyses associated with these scalars for few benchmark scenarios have been presented in this work.

Apply to be
 considered for a student
   award (Yes / No)?

No

Level for award
 (Hons, MSc,
   PhD, N/A)?

N/A

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Please indicate whether
this abstract may be
published online
(Yes / No)

Yes

Primary author: Dr KUMAR, Mukesh (University of the Witwatersrand)

Co-authors: Prof. CORNELL, Alan (NITheP); Prof. MUKHOPADHYAYA, Biswarup (HRI); Prof. MELLADO, Bruce (University of Wisconsin - Madison); KAR, Deepak (University of Witwatersrand); Mr CHAKRABARTY, Nabarun (HRI); Mr REED, Robert (University of Witwatersrand); Mr VON BUDDENBROCK, Stefan (University of the Witwatersrand); Dr MANDAL, Tanumoy (Uppsala University); Dr RUAN, XIFENG (WITS)

Presenter: Dr KUMAR, Mukesh (University of the Witwatersrand)

Session Classification: Theoretical and Computational Physics (1)

Track Classification: Track G - Theoretical and Computational Physics