

Title: SCANNERS: constraining the phase diagram of a complex scalar singlet at the LHC

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Abstract: We present the first version of a new tool to scan the parameter space of generic scalar potentials, SCANNERS (Coimbra et al., SCANNERS project., 2013). The main goal of SCANNERS is to help distinguish between different patterns of symmetry breaking for each scalar potential. In this work we use it to investigate the possibility of excluding regions of the phase diagram of several versions of a complex singlet extension of the Standard Model, with future LHC results. We find that if another scalar is found, one can exclude a phase with a dark matter candidate in definite regions of the parameter space, while predicting whether a third scalar to be found must be lighter or heavier. The first version of the code is publicly available and contains various generic core routines for tree level vacuum stability analysis, as well as implementations of collider bounds, dark matter constraints, electroweak precision constraints and tree level unitarity.

KeyWords Plus: Model Higgs-Boson; Standard Model; Dark-Matter; Root -S=7 TEV; Search; Mass

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