



中国科学院高能物理研究所
Institute of High Energy Physics
Chinese Academy of Sciences



IHEP 5-8月考核

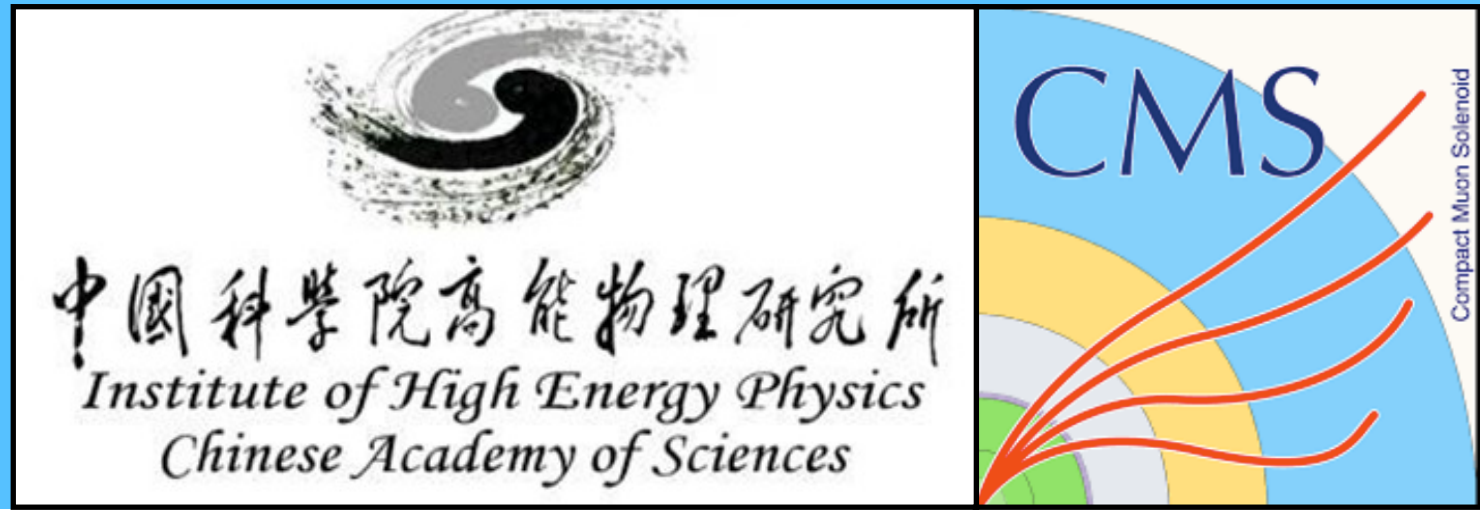
报告人：王储
导师：王锦，陶军全

29/08/2022

IHEP 考核

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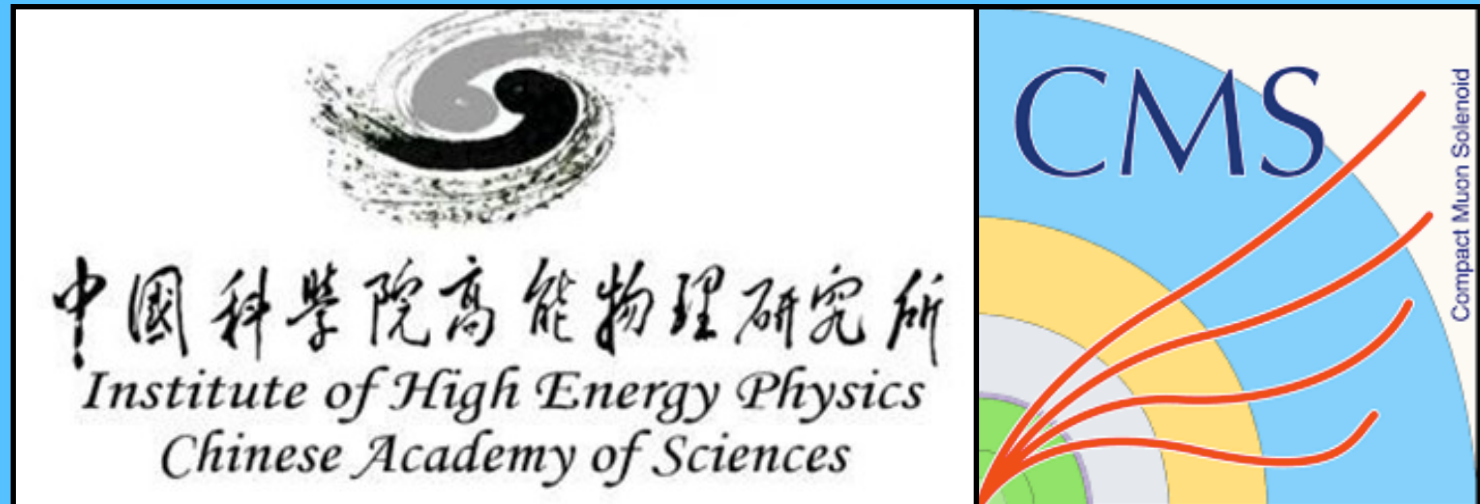
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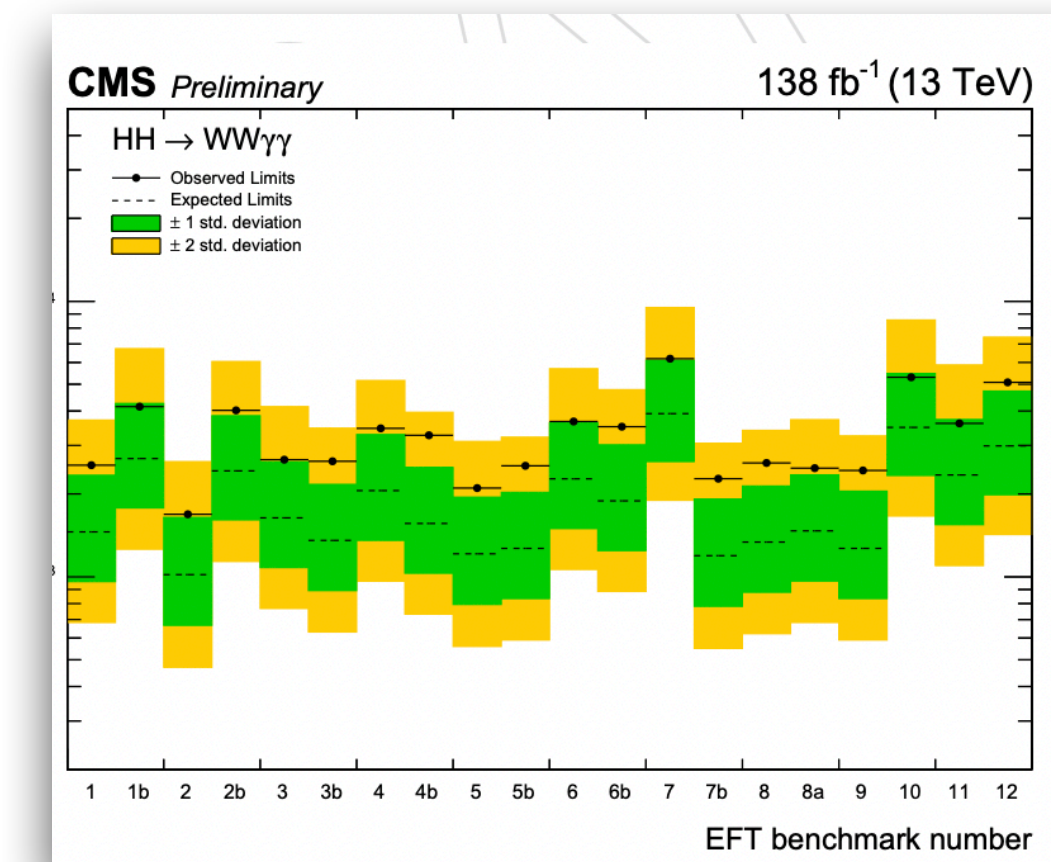
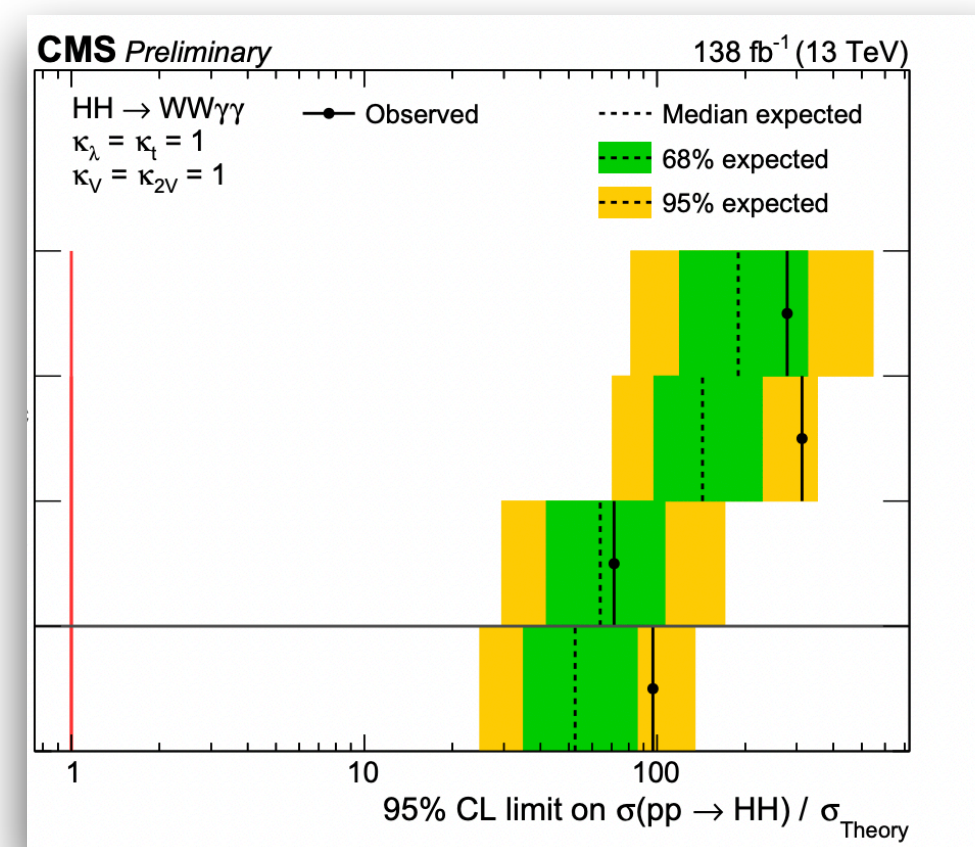
* 服务型工作

双希格斯分析: $WW\gamma\gamma$



► 在过去的四个月里:

- 完成了 $WW\gamma\gamma$ 的分析Unblinding
- HIG convener pre-approved 此分析
- 回复完成了两轮ARC的问题
- 现在在等待ARC的第三轮提问



Analysis pre-approved: HIG-21-014 Search for non-resonant HH -> WW gamma gamma

HIG HIG-21-014



Jan Steggemann steggema

May 24

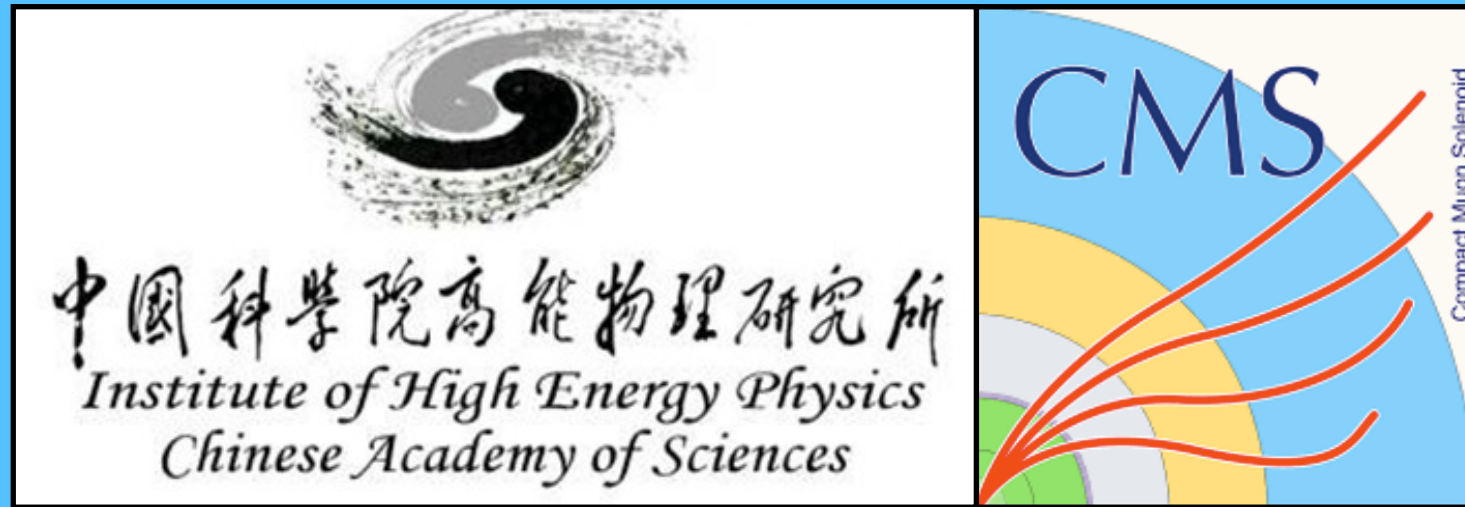
Dear Colleagues,

The physics analysis
`Search for non-resonant HH -> WW gamma gamma`
(CADI entry HIG-21-014)
has been pre-approved on Mon, Oct 25, 2021 by the HIG physics group
and the new status has been updated in CADI.

Best regards,
The HIG conveners: Nicholas Wardle, Jan Steggemann

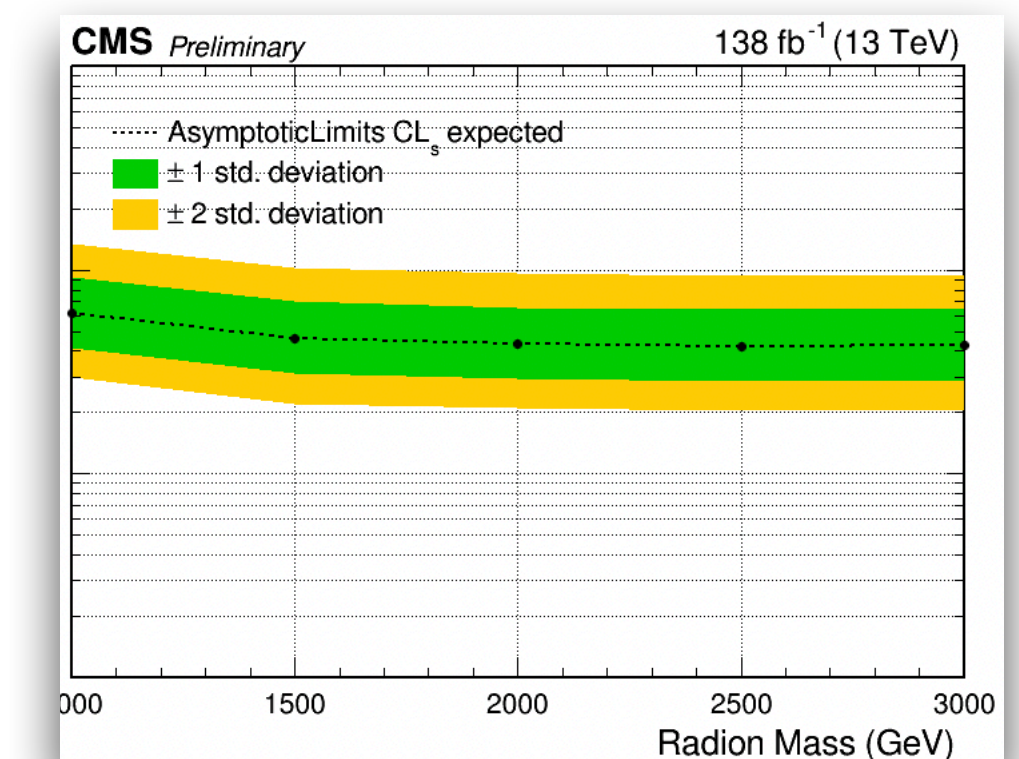
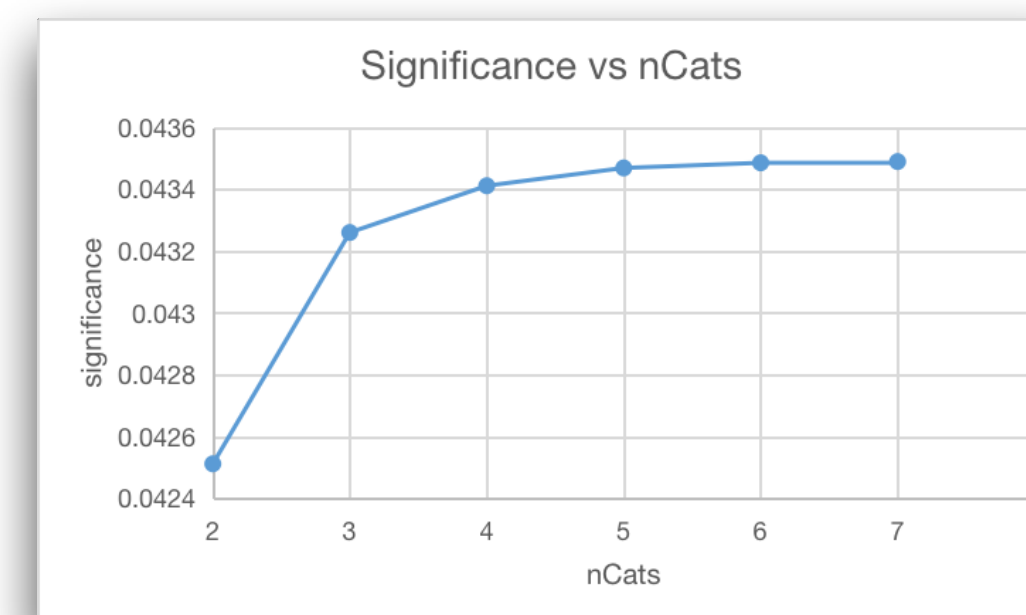
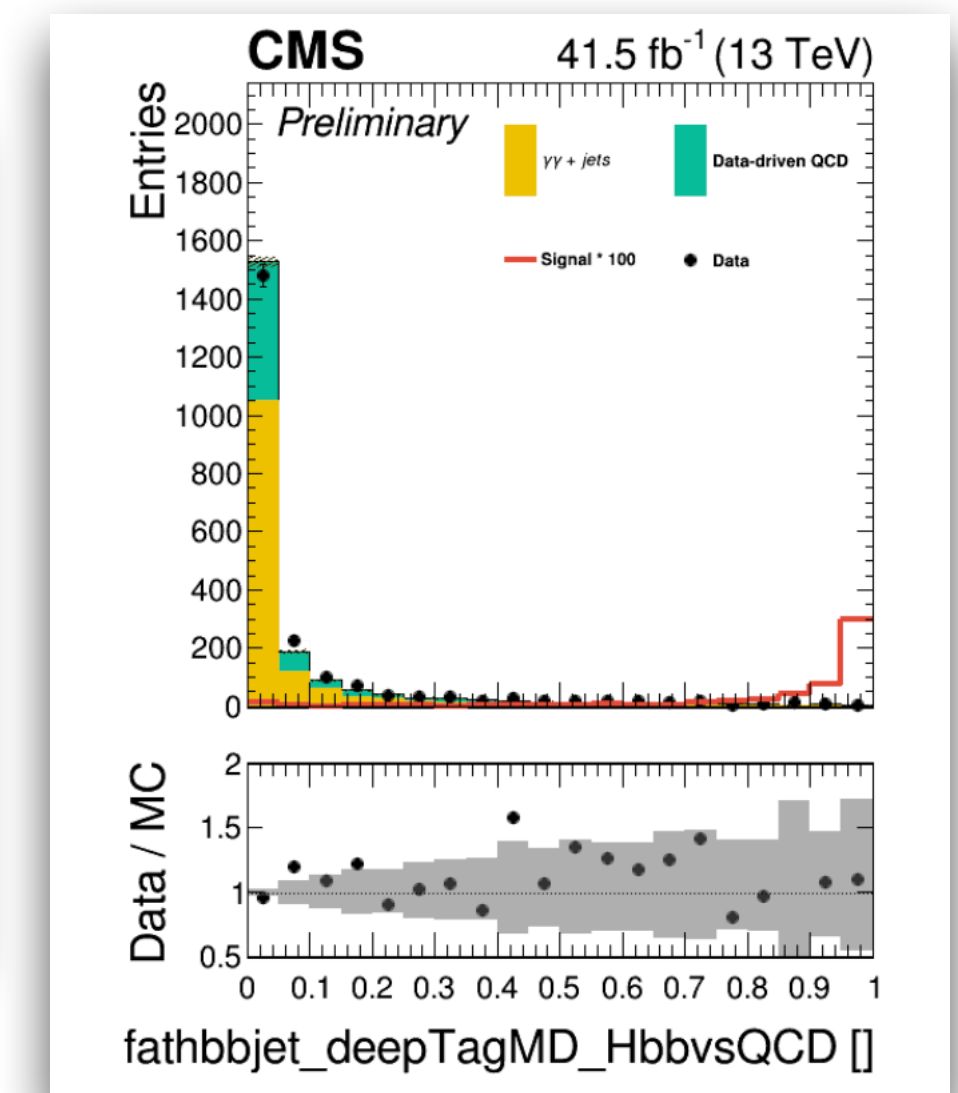
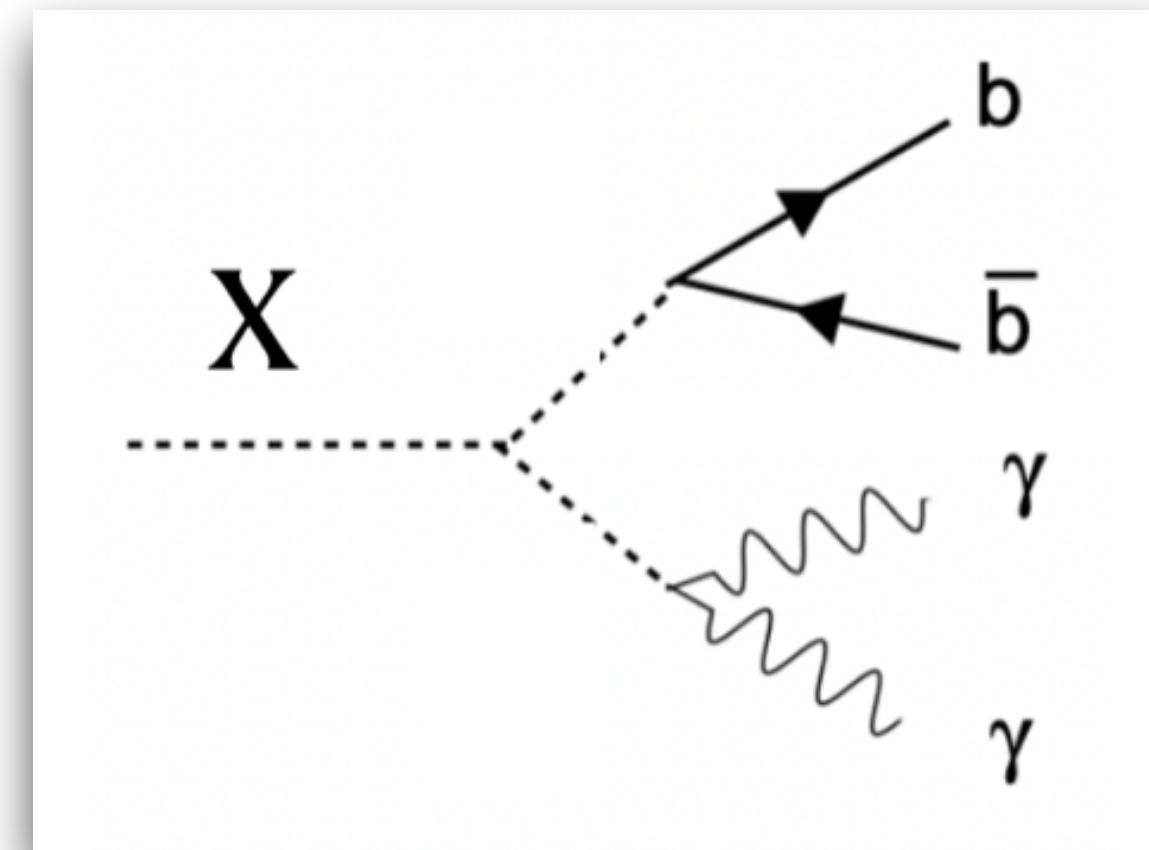
Reply

双希格斯分析: $bb\gamma\gamma$

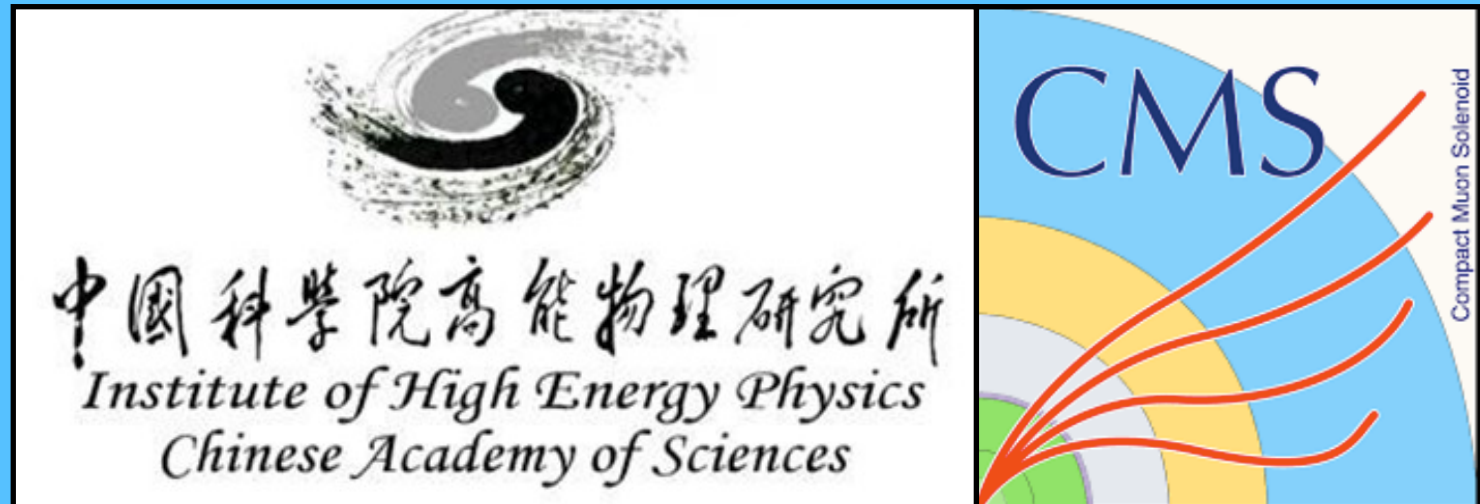


共振态的 $bb\gamma\gamma$ 分析:

- 基于Full-RunII的数据做了初步结果。
- 此分析目前采取Cut-Based的分析策略。
- 本底主要来自于QCD+DiphotonJets。
- 现在的expected的结果与其他分析是可以匹配上的。
- 未来专注于MVA方法提升灵敏度。

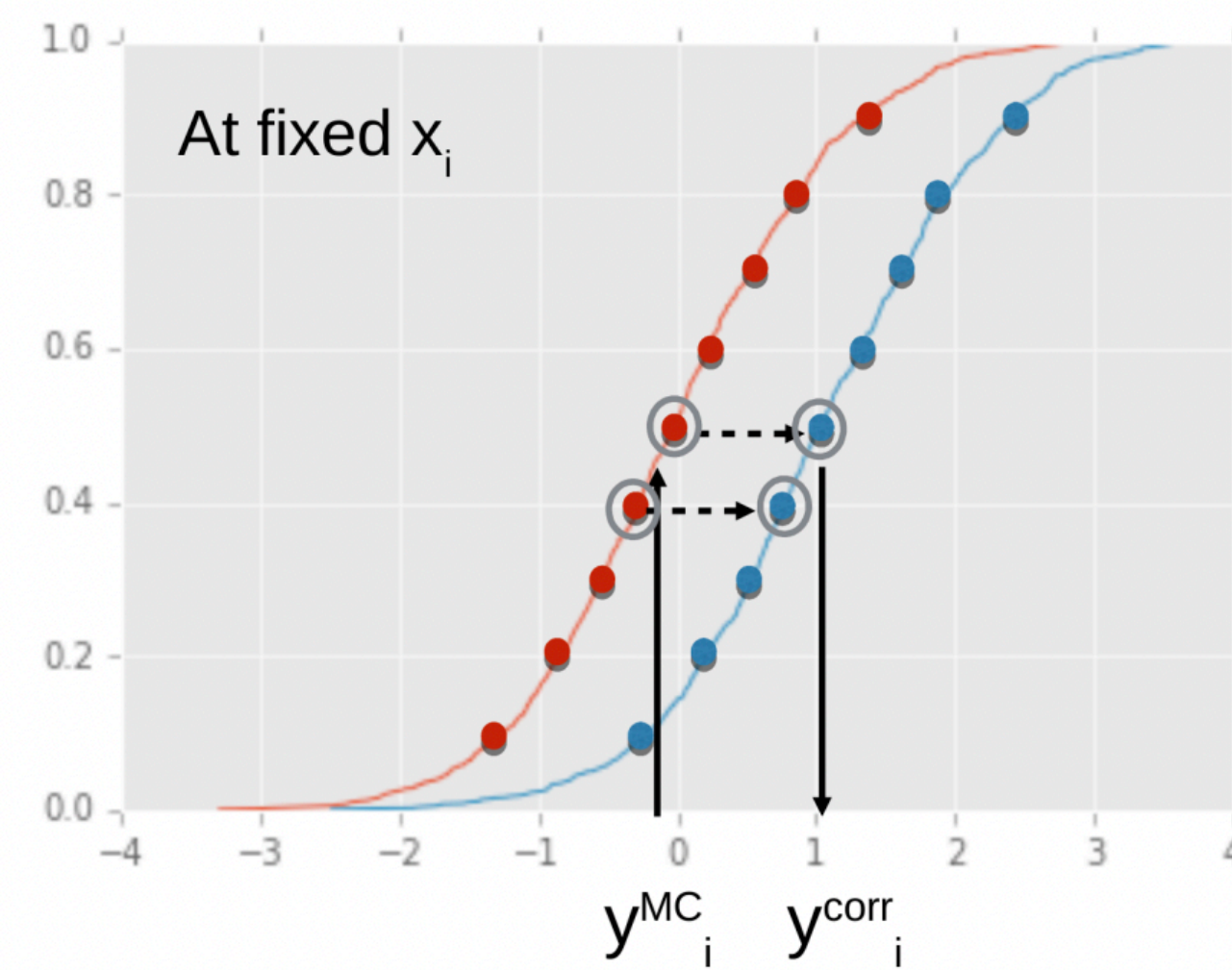
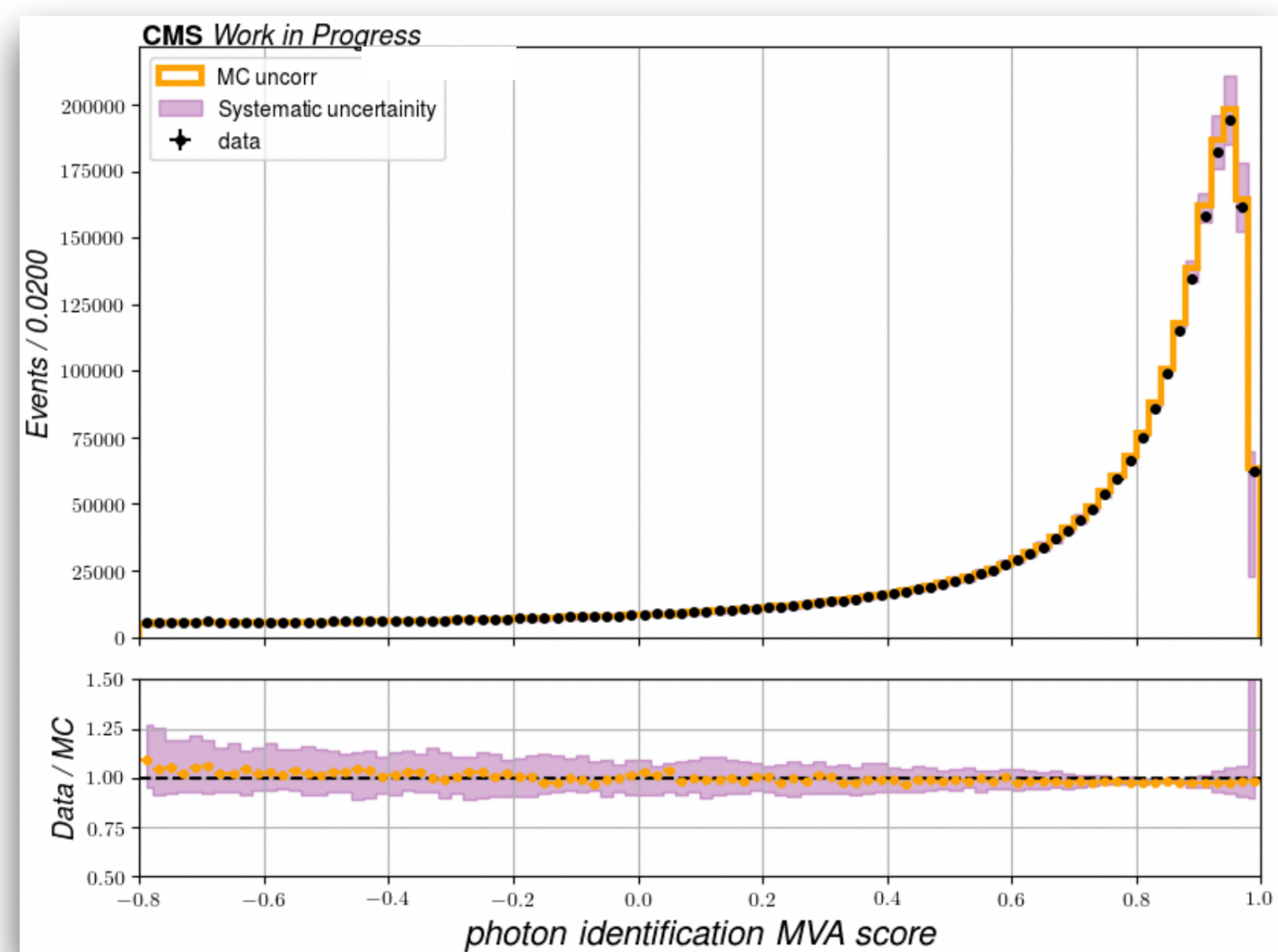
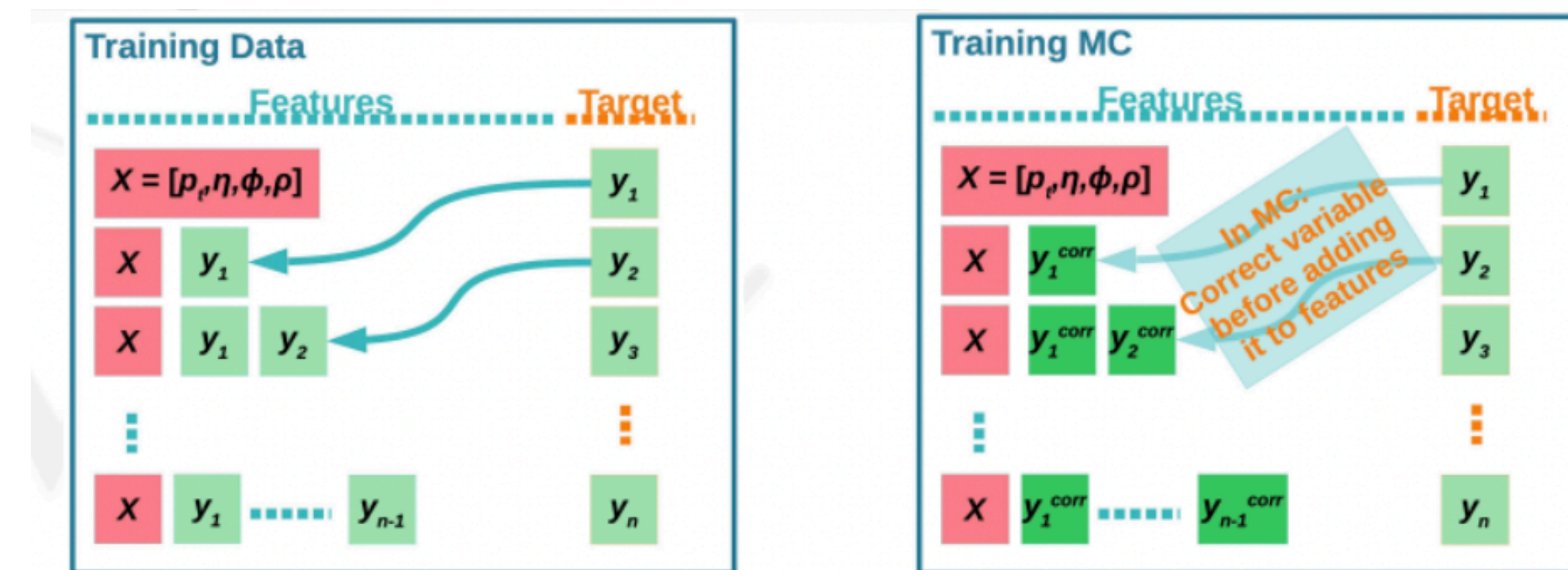


$H \rightarrow \gamma\gamma$ 工作: ShowerShape和Isolation修正



► ShowerShape和Isolation变量对于光子的鉴别十分重要:

- 需要修正MC样本的SS和ISO变量。
- 采取Quantile BDT的方法修正SS和ISO变量。
- 修正之后MC和Data符合的很好。



► G-M 模型的唯象分析:

- GM模型是一个BSM模型。
- 根据GM模型在参数空间撒点。
- 使用2016年Low Mass希格斯的寻找结果进行参数范围的排除。
- 此分析上次考核前已被CPC接收。
- 这几个月按照编辑的要求更新了部分图片和内容。
- 现已发表(2022 Vol.46, No.8)。[[Link](#)]

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Search for a lighter neutral custodial fiveplet scalar in the Georgi-Machacek model*

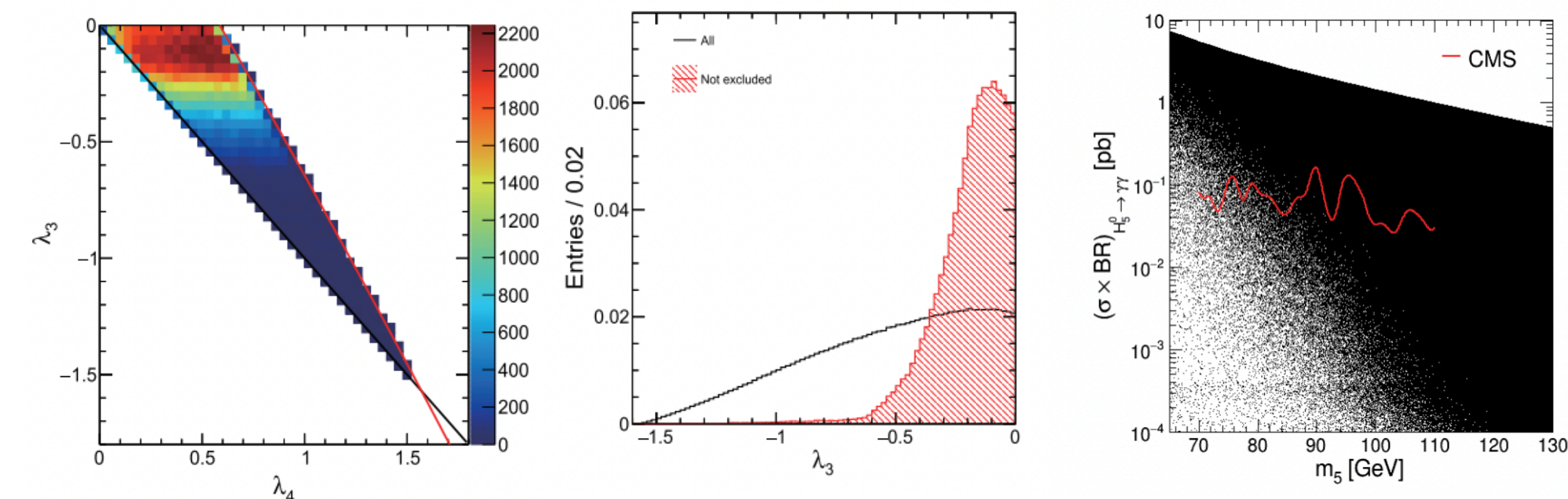
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Abstract: Many researches from both theoretical and experimental perspectives have been performed to search for a new Higgs Boson that is lighter than the 125 GeV Higgs boson, which was discovered at the LHC in 2012. In this study, we explore the possibility of constraining a lighter neutral custodial fiveplet scalar H_5^0 in the Georgi-Machacek (GM) model using the latest results of the search for a lighter Higgs boson decaying into two photons from LHC data. The custodial-singlet mass eigenstate h or H is considered to be the LHC observed 125 GeV Higgs boson. A new set of constrained parameters that is favoured by low-mass H_5^0 is proposed to generate events efficiently. The production of H_5^0 from a scan based on the constrained parameters is compared to the latest results of the search for a lighter Higgs boson decaying into two photons by the CMS Collaboration after applying theoretical constraints from the GM model and constraints from all existing relevant experimental measurements, including the recent results of the Higgs boson searches by the LHC. Numerical analyses of the surviving GM parameter space are performed. The tendencies and correlations of the GM input parameters from phenomenological studies are summarized. In addition, the discovery potential of the other interesting decay channels of this low-mass neutral custodial fiveplet scalar are discussed.

Keywords: Georgi-Machacek model, lighter neutral custodial fiveplet scalar, phenomenological studies

DOI: 10.1088/1674-1137/ac6cd3



▶ $H \rightarrow \gamma\gamma$ MC 产生工作:

- 继续为Hgg组产生MC样本, 近期提交了H+c和H+b的样本, 以及部分GJet+QCD样本等...

▶ ECAL的探测器值班工作:

- 在过去的四个月里, 共参与为期4周的ECAL detector on call 工作。

Showing 1 to 2 of 2 entries

	Subsystem ▲	Type ▲	Flavour ◆	Shifter ◆	Institute ◆	Sum of CSP ◆	Number of Shifts Done ◆
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<input type="checkbox"/>	ECAL	DOC	main	Wang, Chu	BEIJING-IHEP	11.00	4.00
						Sum this page	47.12
						Sum all pages	25.00

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Show 10 entries

► 双希格斯分析:

- $WW\gamma\gamma$ 部分已经接近完成, 希望在一两个月内进行approve报告
- $bb\gamma\gamma$ 完成了初步的结果, 希望能在本年度pre-approve.

► $H \rightarrow \gamma\gamma$ 相关工作:

- 完成ShowerShape和Isolation修正。

► 其他工作:

- 继续产生RunII和RunIII的MC样本
- 继续参与ECAL的Doc值班
- 在CMS China 和 高能物理分会做了HH相关的报告