Scaling up the estimation of exclusion contours with Active Learning

Irina Espejo[1], K. Cranmer[1], P. Rieck[1], Z. Bhatti[1], L. Heinrich[2], P. Gadow[3], J. von Ahnen[4], E. Skorda[5]
[1]NYU [2]TMU [3]DESY [4]DESY [5]Lund

Motivation

Estimate exclusion contours more efficiently and scale up the methodology in parameter dimensions

Methodology

Given a BSM model with param **θ**

WARM START

1 Submit a param grid to MadGraph, get xsec(**θ**)

Gaussian Process Regr.

Poisson-disc sampling

Multitask GP Regr.

2 Submit param suggestions to Simple-Analysis, get $\mu^{UL}_{exp\,SA}(\theta),\ \mu^{UL}_{\pm 1\sigma\,SA}(\theta),\ \mu^{UL}_{\pm 2\sigma\,SA}(\theta)$

Gaussian Process Regr.

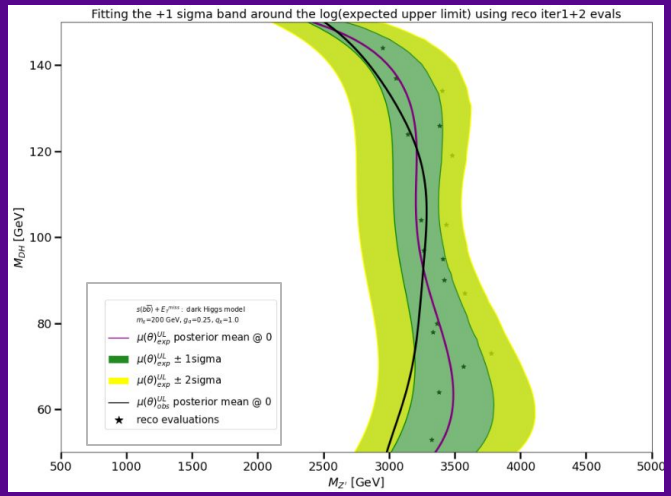
Poisson-disc sampling

Multitask GP Regr.

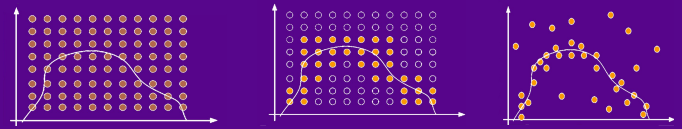
3 Submit params suggestions to reco- level

Active Learning

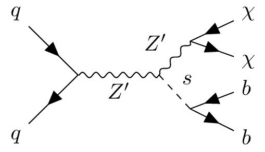
Getting a full 2D **contour plot**



with **only 25 reco evals**



Case study: Mono-H(bb) Run II

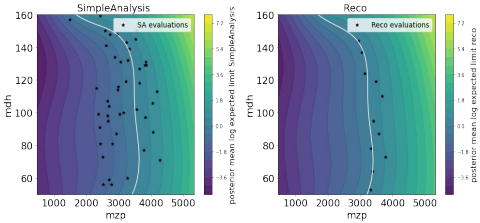


parameters

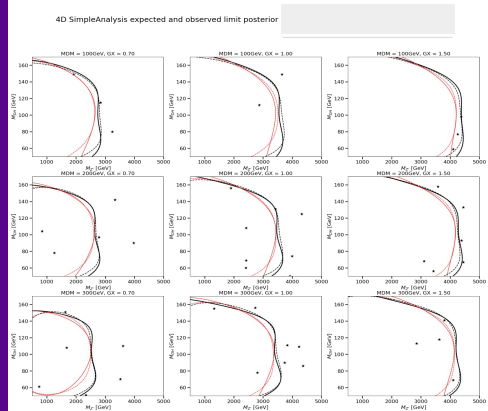
$M_{Z'}$ M_s
M_χ g_χ

Results

✓ Obtained coherent expected and observed contours for 2D (mzp, mdh)



✓ Efforts scaling up to 4D
So far only 320 SA points



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