

CEPC SW



Alternative Solenoid Config BMR

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Context

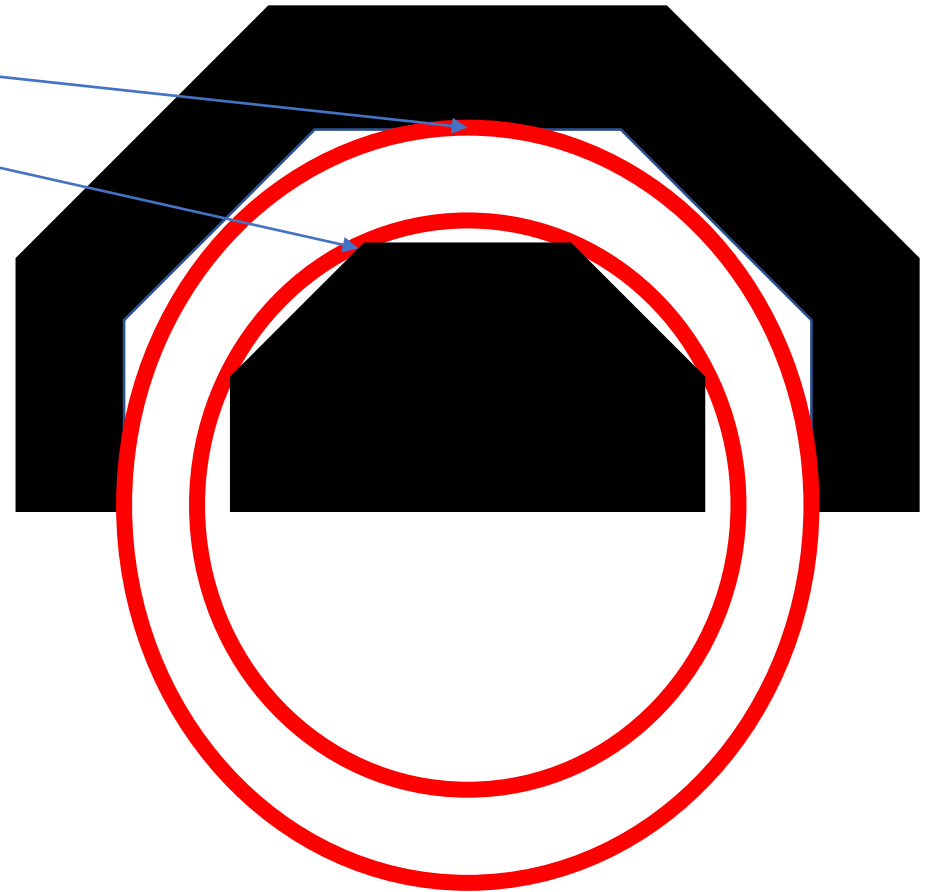
- ┆ Drop the cost by putting the solenoid between the ECAL and HCAL!
- ┆ Previously has been studied by Jiechen: Today's short report will mostly be about me catching up to his.
 - ┆ Also, many questions I wonder if anyone can help me with.

Variable Definitions as Defined in the Original Work / Samples

- E : ECAL / H : HCAL / C : COIL
- G : Gap / W : Width / O : Geometrical overlap compensation
- $G_{TOTAL} \equiv 2 * G_{EC} + W_C + 59.5(?) + O_{EC}(30mm) + O_{HC}(79.8mm)$

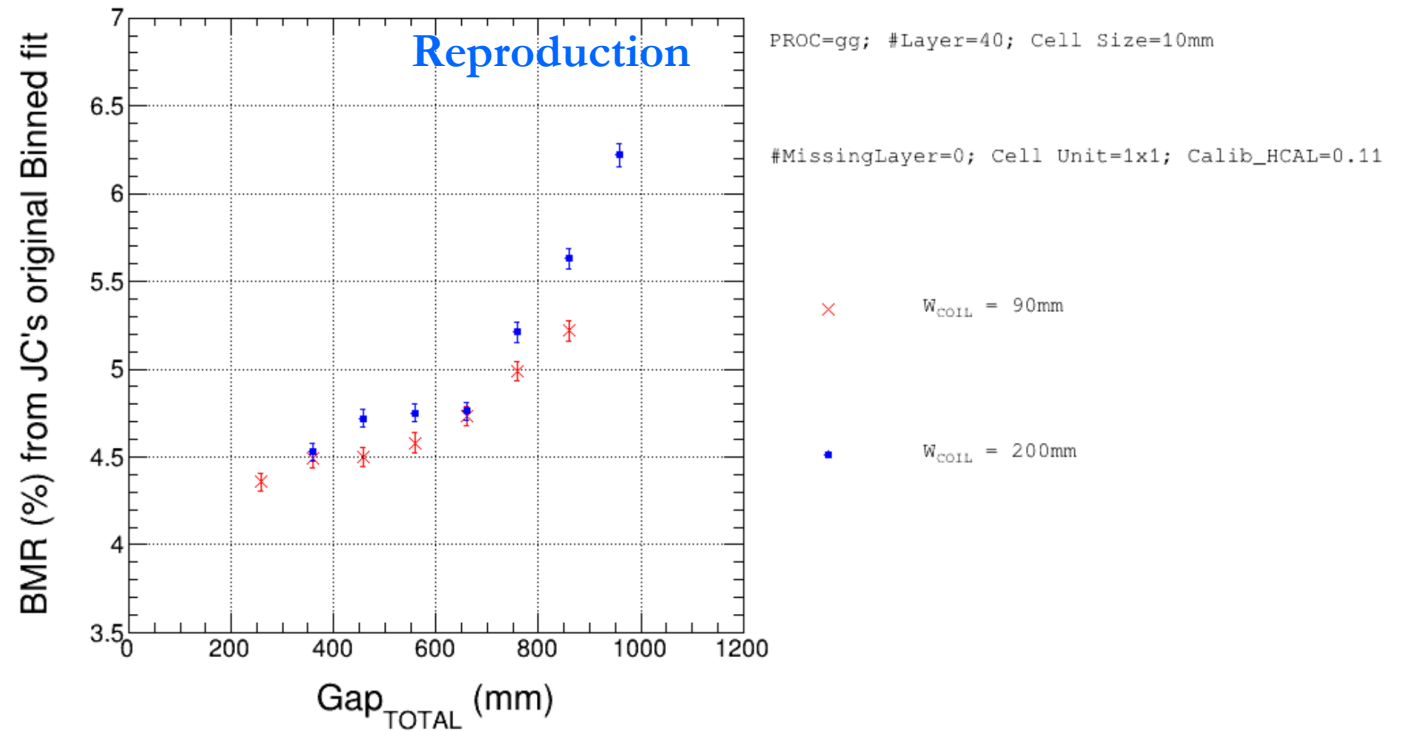
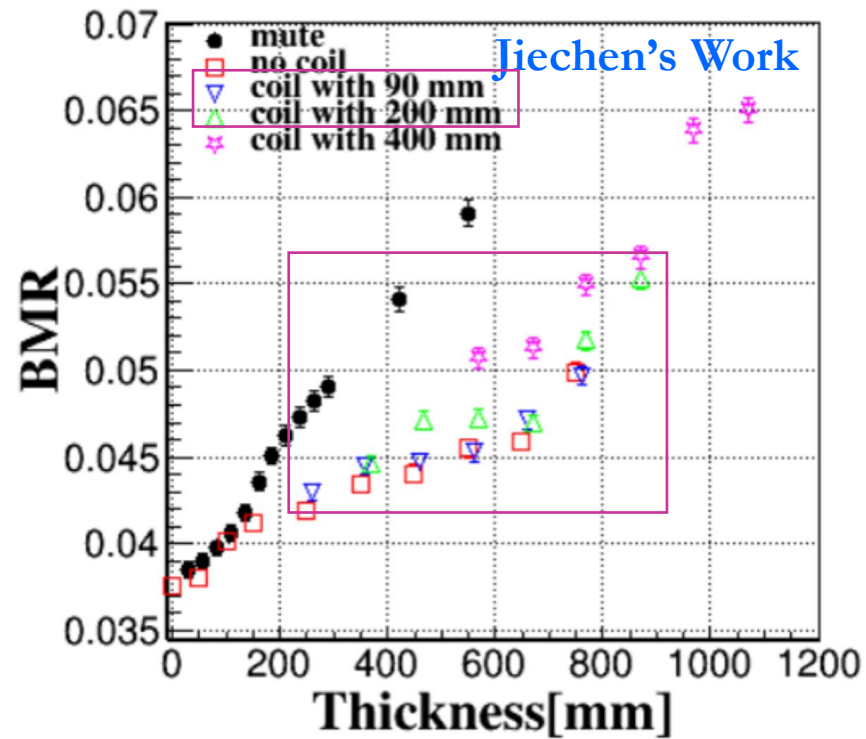
- Samples are generated and reconstructed as:
 - $(W_C = 0, 90, 200, 400mm) \times (G_{EC} = 0, 50, 100, 150, 200, 250, 300mm)$
 - $\nu\bar{\nu}(H \rightarrow gg)$ sample
 - Default ECAL setting

- Q1: Am I understanding the values alright?
- Q2: Is there any assets that helps me tweak the geometry and see it graphically?



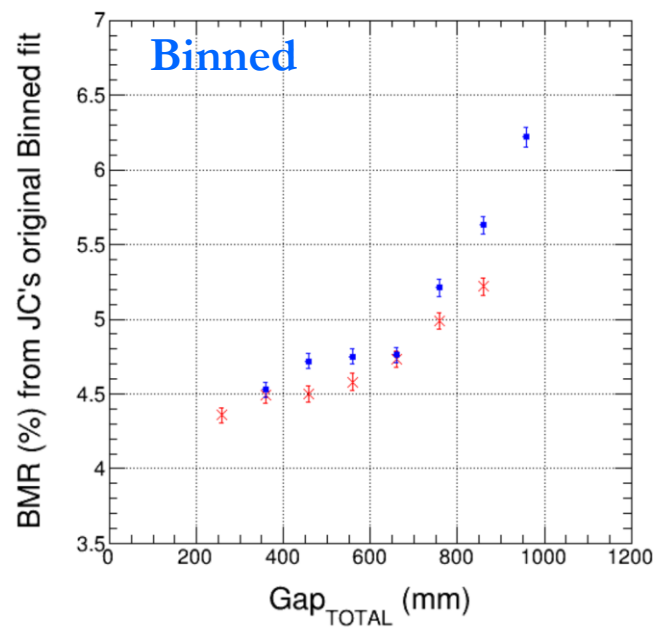
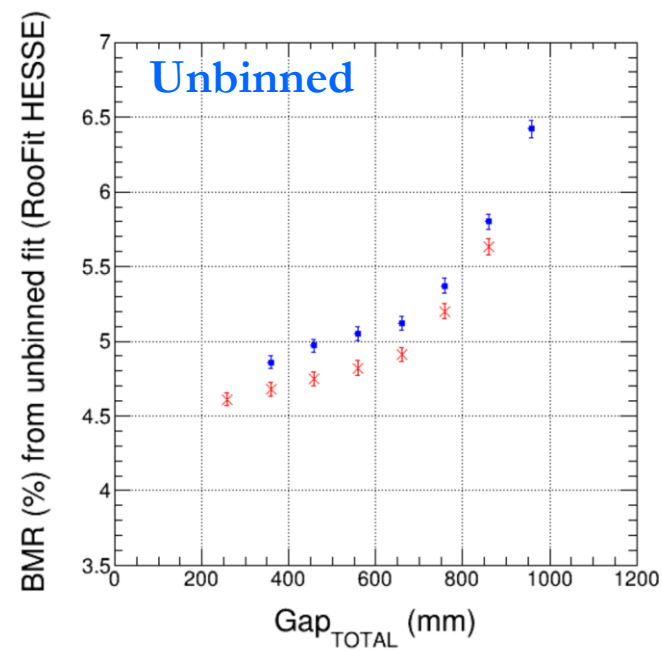
BMR Calculation Procedure

- ┆ $|MAX(\cos\theta_{JET})| < 0.85$
- ┆ M_{Higgs} is fitted with Gaussian
- ┆ $BMR \equiv \sigma_{Gauss}/M_{Gauss}$



Alternative: Unbinned ML fit vs. Binned (original fit)

┆ Unbinned ML fit instead of Binned histogram fit



PROC=gg; #Layer=40; Cell Size=10mm

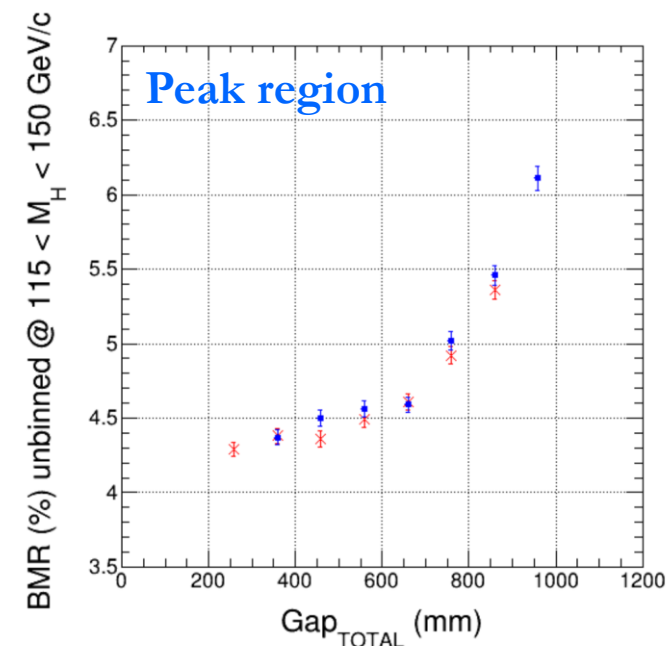
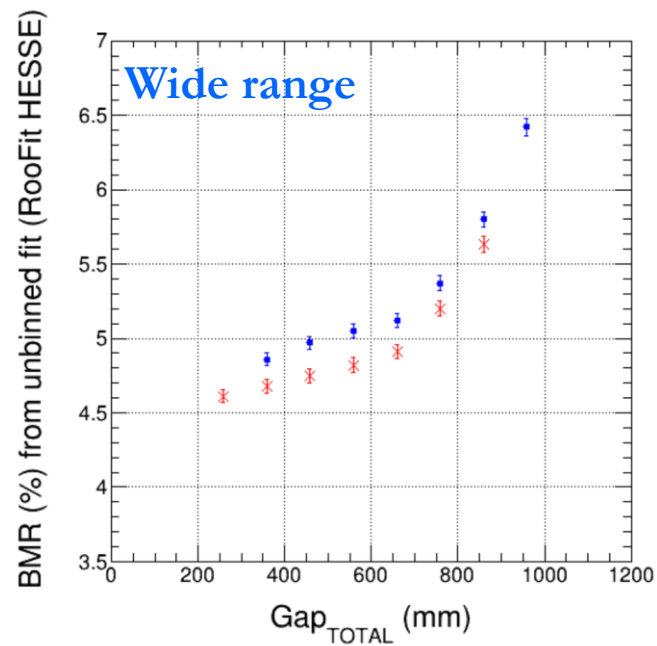
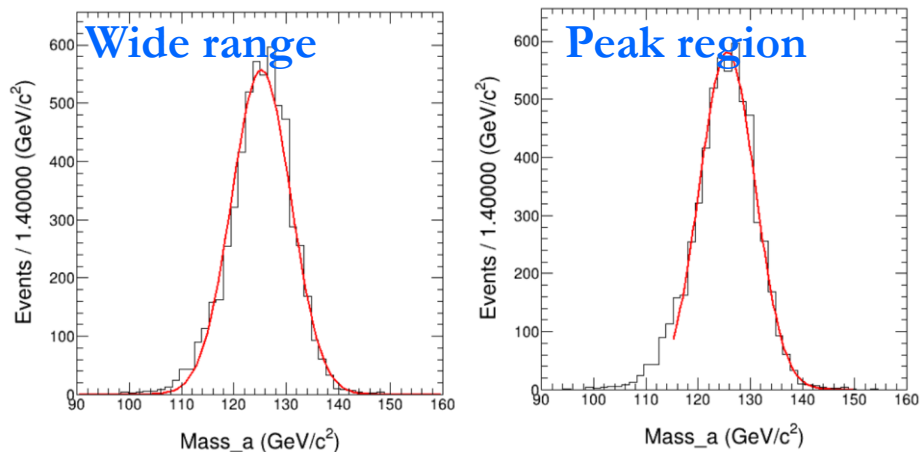
#MissingLayer=0; Cell Unit=1x1; Calib_HCAL=0.11

× W_{COIL} = 90mm

■ W_{COIL} = 200mm

Alternative: Fit Only the Peak

‣ Gaussian fit to the peak region: veto the lower mass tail: As 0.X% shift is a major factor in determination of significance!!!



Summary

- ┆ I now have the procedures to replicate the Jiechen's previous results.
- ┆ However there are a few things I would like to discuss:
 - ┆ Unbinned vs Binned?
 - ┆ The lower mass tail (Will examine what the structure is; currently the #event is too small that for determining the exact structure of the region)
- ┆ I still need to understand the geometry a bit more
 - ┆ I feel limited with resources at the moment...
 - ┆ Helps regarding the geometry variables (as in the XML inputs) and ways of visualizing them will greatly help!