Background estimates:

Currently, only looking at Signal Efficiencies → smaller by factor > 10
… not surprising given

a) Our trigger selection is a subset of CR in BC N
b) We additionally require the N–1/N correlation, which CR does not.

BUT: the N-1/N correlation also reduces QCD background

So instead of comparing signal efficiencies, we should compare $\dfrac{S}{\sqrt{B}}$

The main idea of our trigger was to reduce background, so we should account for this in our pheno studies :)

Since $S_{\mathrm{B2F}} < 0.1 \times S_{\mathrm{CR}}$ we need $B_{\mathrm{B2F}} < 0.01 \times B_{\mathrm{CR}}$ (i.e. a factor of 100 better background suppression)
Assuming the backgrounds to be equal except for additional suppression via N-1/N correlation, we can make a rough estimate:

$$\frac{B_{\mathrm{B2F}}}{B_{\mathrm{CR}}} = \frac{1}{\pi} \times \frac{\int_{40}^{100} \mathrm{MET}}{\int_{0}^{100} \mathrm{MET}} \approx \frac{1}{\pi} \times 0.029 = 0.0094 \quad \checkmark$$

MET must be correlated in φ

MET must exceed 40 GeV
→ We can look up Zerobias MET distributions in https://arxiv.org/pdf/2005.09554 and https://www.hepdata.net/record/ins1796953 (N.B. only for Run-2, i.e. PU ~ 55, and at HLT level)

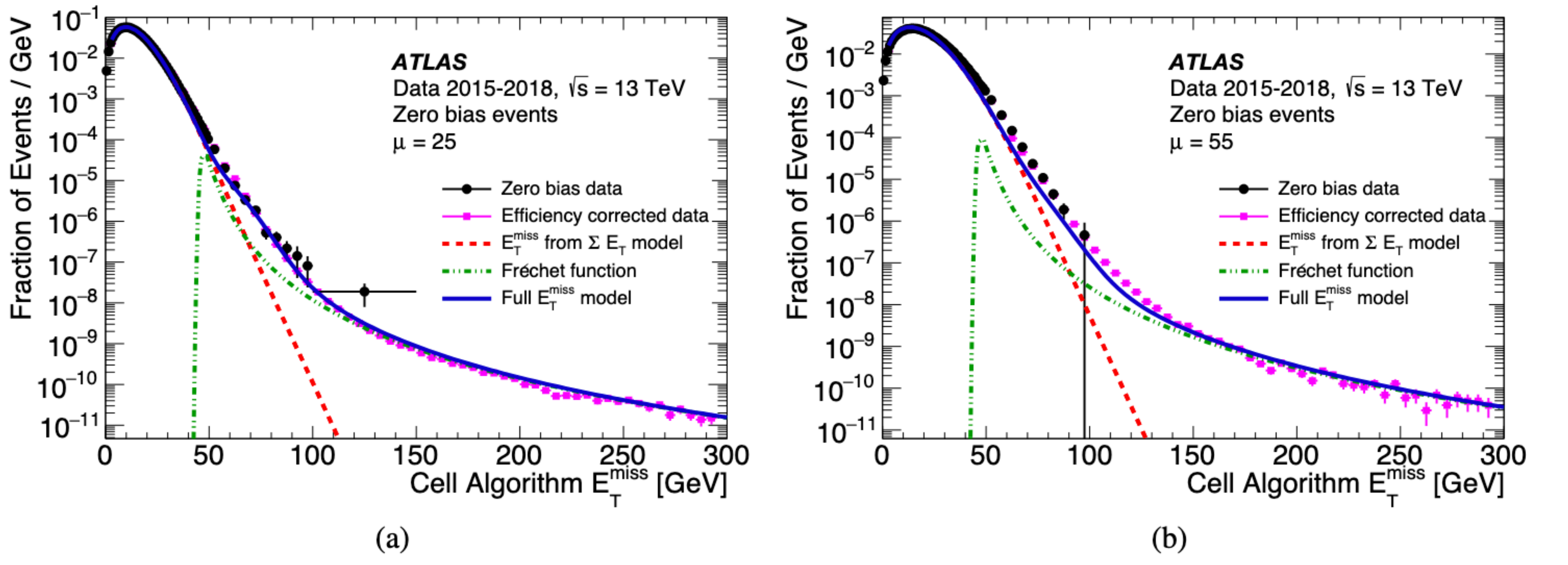

Figure 1: A comparison of the measured `cell` E_T^{miss} distribution with that predicted by the two-component model for two pile-up scenarios compared with data. The circular points show the data collected using zero bias triggers, but have insufficient luminosity to probe the higher E_T^{miss} portion of the distribution. The square points extend the measured distribution using L1 $E_T^{miss} > 30$ GeV and L1 $E_T^{miss} > 50$ GeV data. The uncertainties for the data points are statistical only, and much larger for the zero bias data due to the limited luminosity. The dashed (red) curve is the prediction from the calorimeter-resolution part of the model. The dash-dotted (green) curve is the high E_T^{miss} tail's probability distribution for the mean number of pp interactions μ in each figure. The solid (blue) curve is the full model prediction computed by combining the E_T^{miss} from these two individual sources shown in red and green, each calculated for $\mu = \langle\mu\rangle$. The black points show the unbiased E_T^{miss} distribution measured in data. (a) corresponds to a prediction for $\langle\mu\rangle = 25$ while (b) corresponds to $\langle\mu\rangle = 55$.