A new WGAN

- Trained on 40 GeV showers. Approx half a million
- Shower is 48x13x13
- Architectures
 - very similar to WGAN in our "getting high paper"
 - Latent Optimized WGAN, inspired by DeepMind

Our classical WGAN





<u>arXiv: 1912.00953</u>

Figure 3: (a) Schematic of LOGAN. We first compute a forward pass through G and D with a sampled latent z. Then, we use gradients from the generator loss (dashed red arrow) to compute an improved latent, z'. After we use this optimised latent code in a second forward pass, we compute gradients of the discriminator back through the latent optimisation into the model parameters θ_D , θ_G . We use these gradients to update the model. (b) Truncation curves illustrate the FID/IS trade-off



WGAN Latent Opt.

- Trained on uniform energy showers 10-100 GeV. Approx half a million
- Shower is 48x13x13



WGAN Latent Opt.

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Fit to Gaussian for linearity and width!!

Linear Correlations

GEANT4





WGAN-LO

GEANT4 - WGAN-LO



Linearity and Width



Thank you

How to choose best iterations (i.e epoch)



Training

DESY.

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Overlay in X-Y



Overlay in Y-Z

Geant4





WGAN-LO



Overlay in Z-X

Geant4





WGAN-LO



- Trained on 40 GeV showers. Approx half a million
- Shower is 48x48x48
- Architecture is very similar to WGAN in our "getting high paper"



WGAN update: core

х-у



z-y

Z-X

WGAN update: core

• Training started yesterday on 3 P100s



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Some examples

