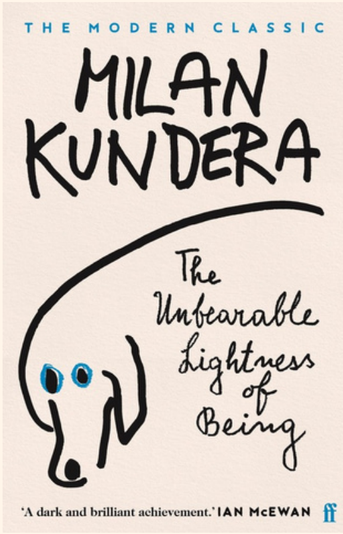
Larissa Kiriliuk

STAR WARS



Asymptotic Freedom for Holographic Energy Correlators

Larissa Kiriliuk, Ameen Ismail & Csaba Csáki

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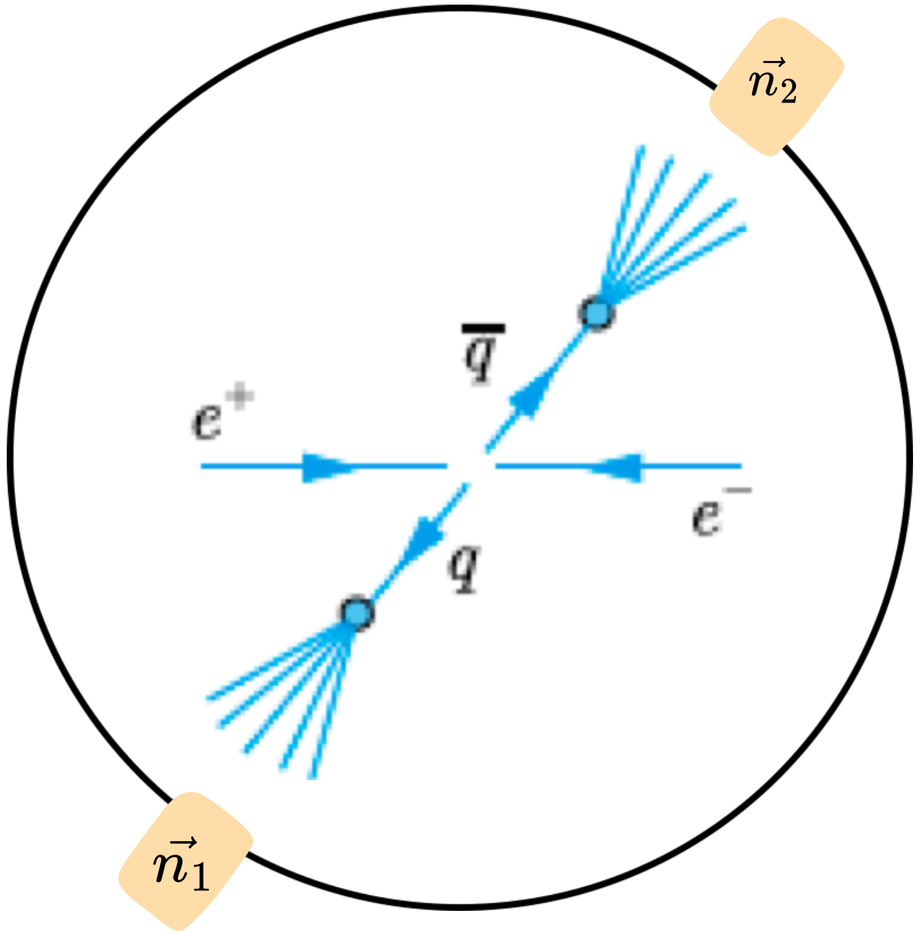
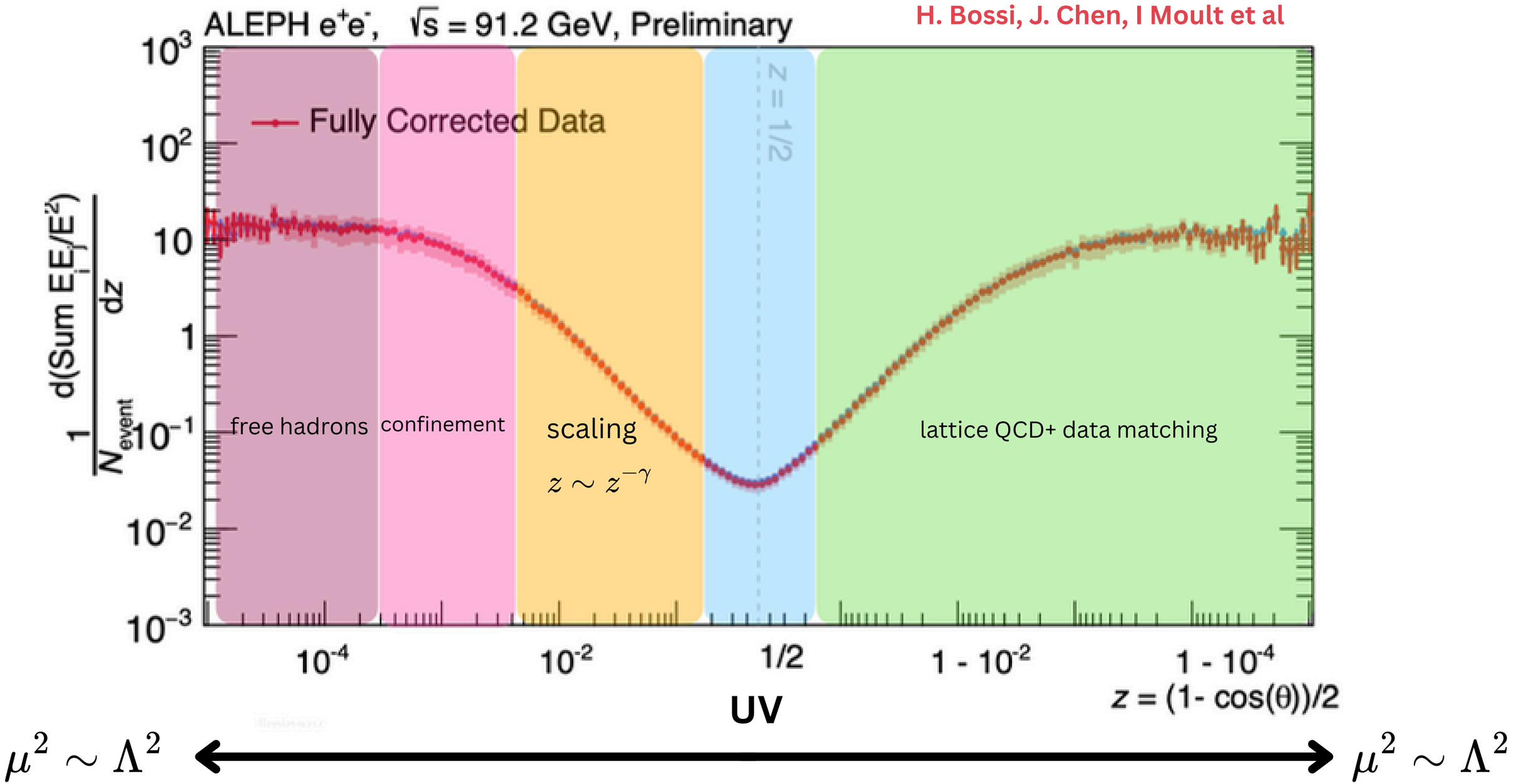
Motivation



$$\left\langle \mathcal{E}(\vec{n}_1)\mathcal{E}(\vec{n}_2) \right\rangle$$



H. Bossi, J. Chen, I Moult et al

$\mu^2 \sim \Lambda^2$ ⟷ $\mu^2 \sim \Lambda^2$

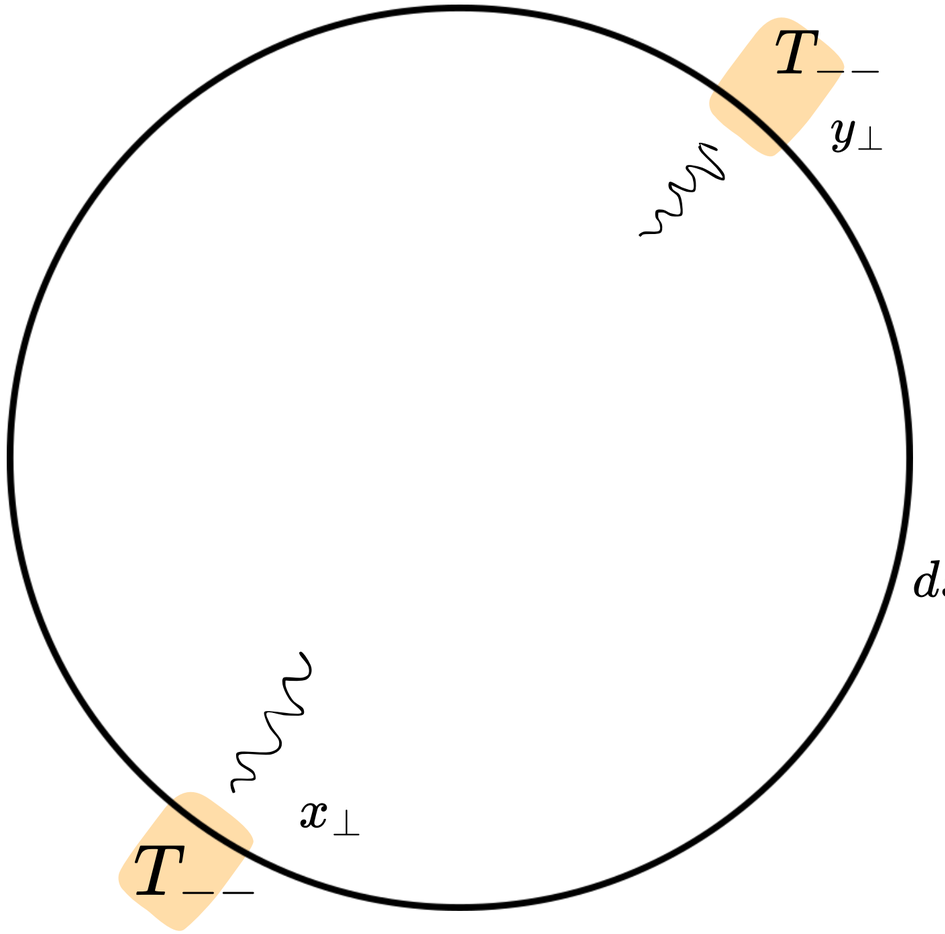
Holographic EEC

AdS / CFT

weakly coupled gauge theory

strongly coupled gauge theory

Inserting EEC



$$\delta S_{CFT} = \epsilon \int d^4x \; T_{--}\delta(x^+)\delta^2(x_\perp)$$

$$ds^2 = ds^2_{\text{AdS}} + f(x_\perp, z=0)\delta(x^+)|dx^+|^2$$

shockwave prescription

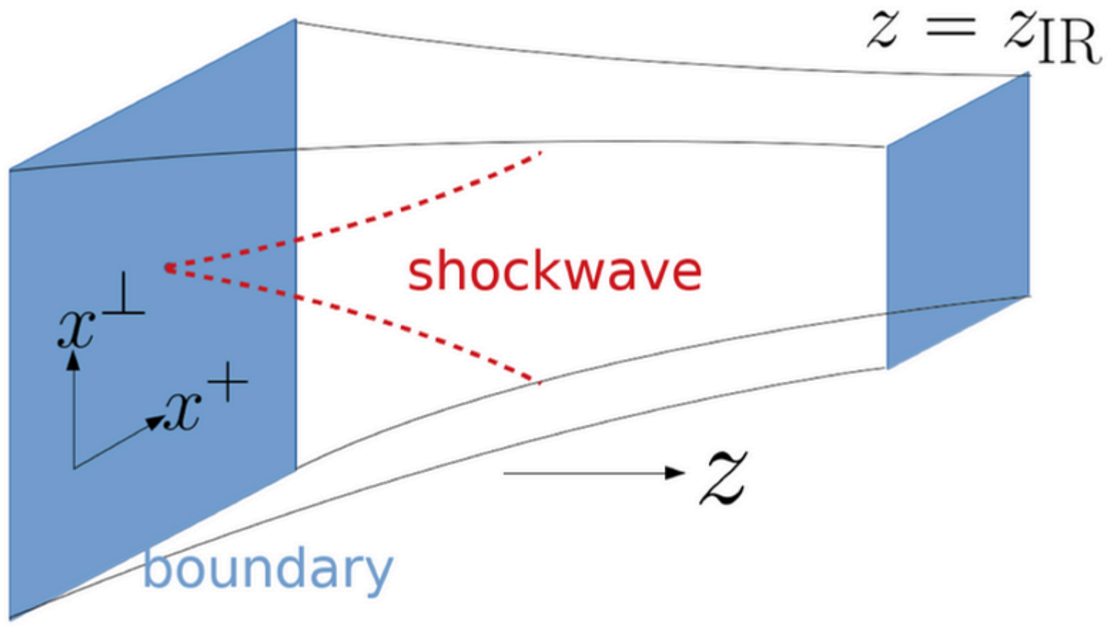
for a scalar state in the bulk with $q^\mu = (q, \vec{0})$

$$\langle \mathcal{E}(0)\mathcal{E}(x_\perp)\rangle \sim \left(1+(x_\perp)^2\right)^3 f(x_\perp, z=1)$$

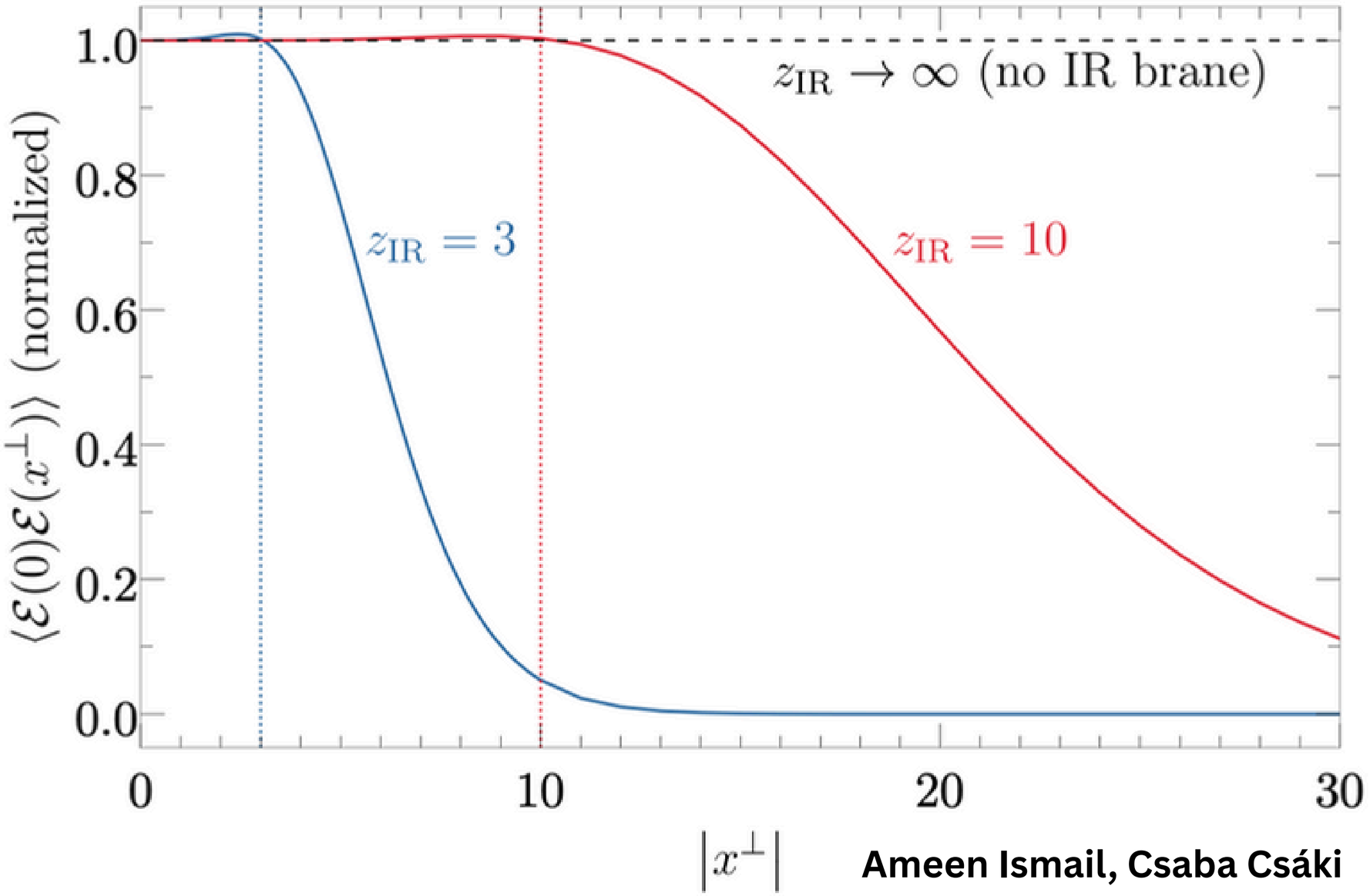
once you have shockwave, correlator is determined

Towards confinement

- “simplest” confinement model: add a scale in CFT
- equivalent to adding an IR brane in AdS



Holographic EEC: IR brane at z=zIR



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Towards confinement : running

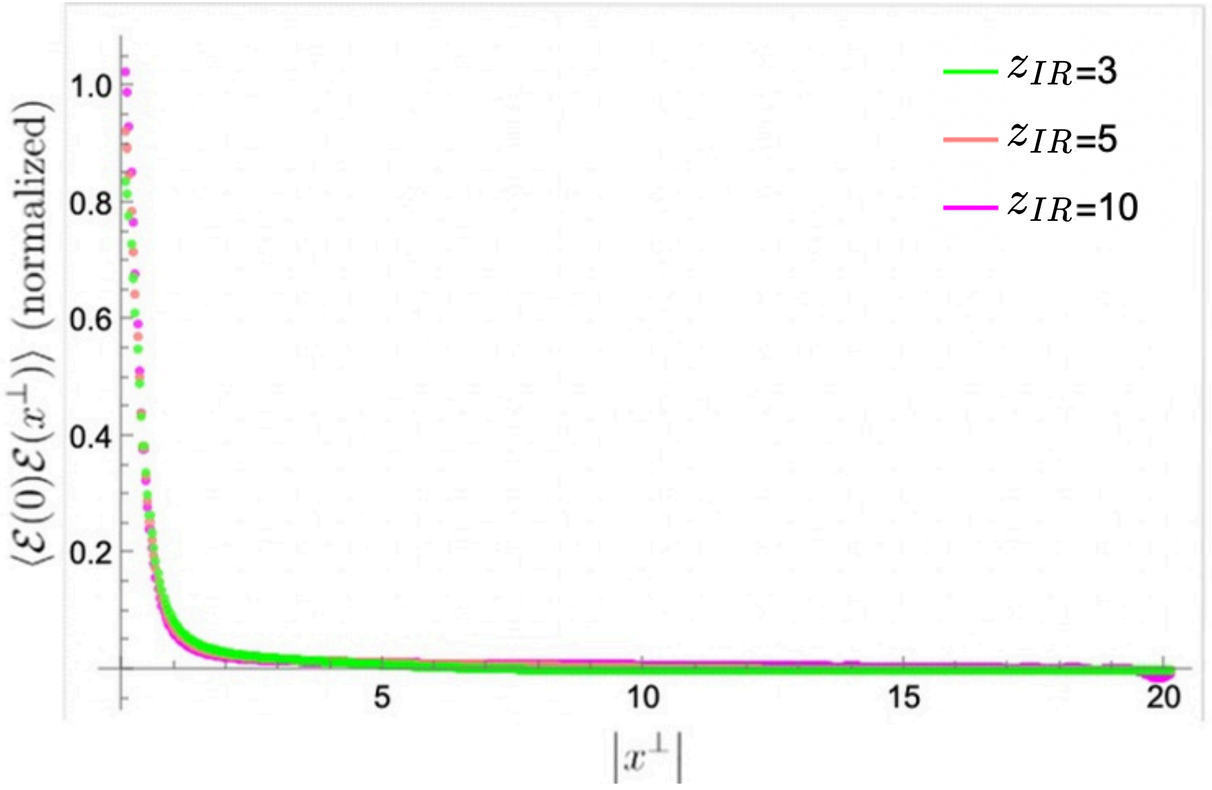
- can we include running/ asymptotic freedom ?
- example of braneless like approach as in **Reece M & C.Csáki** (2006)

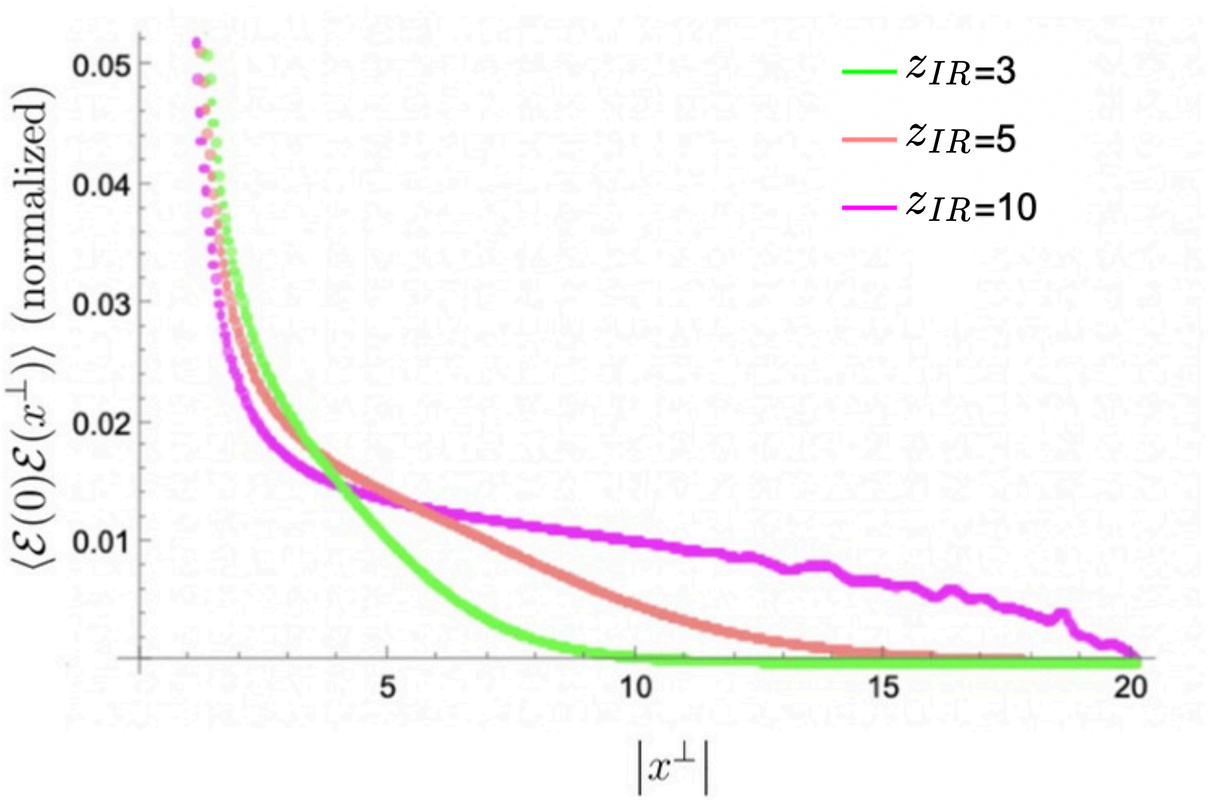
$$e^{-2A(z)}\eta_{\mu\nu}dx^\mu dx^\nu - \frac{1}{z^2}dz^2 = \frac{1}{z^2}\left[\sqrt{\log\frac{z_0}{z}}\eta_{\mu\nu}dx^\mu dx^\nu - dz^2\right]$$

→ singularity at $z = z_0$

→ near UV, expect similar AdS metric up to Log corrections

Results





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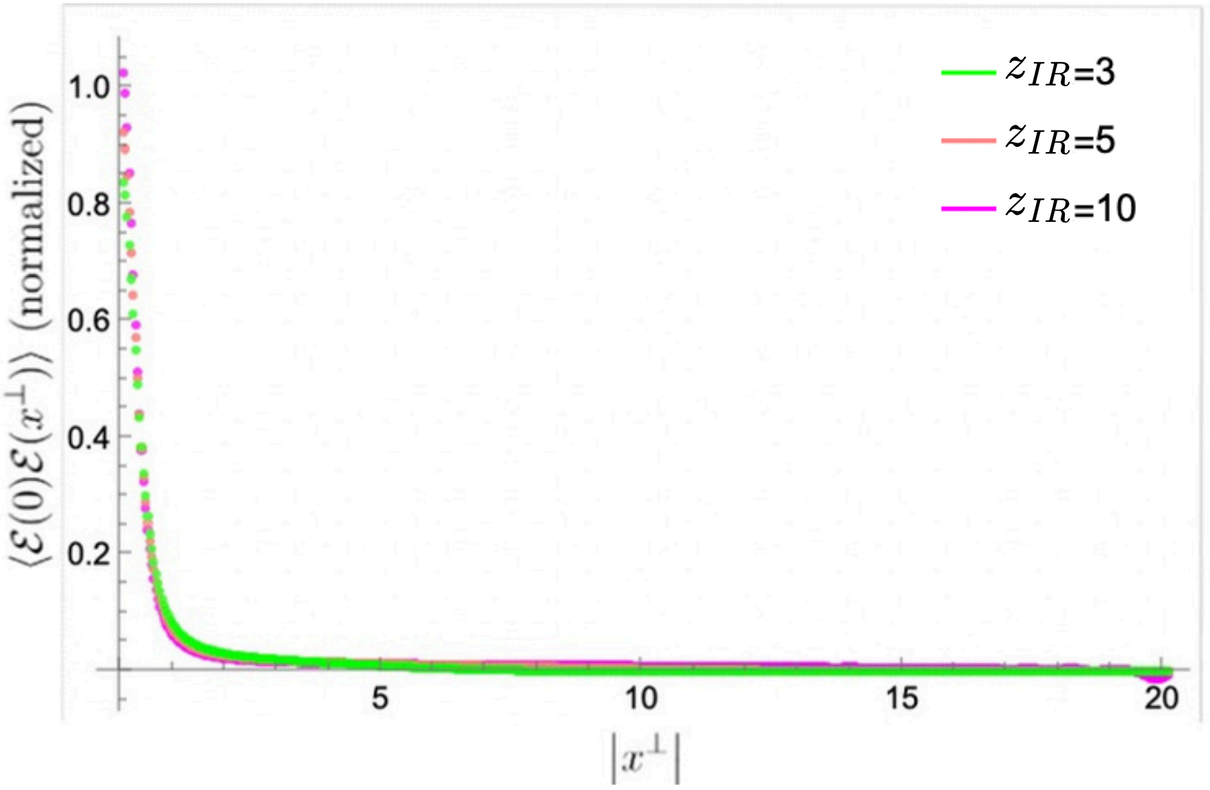
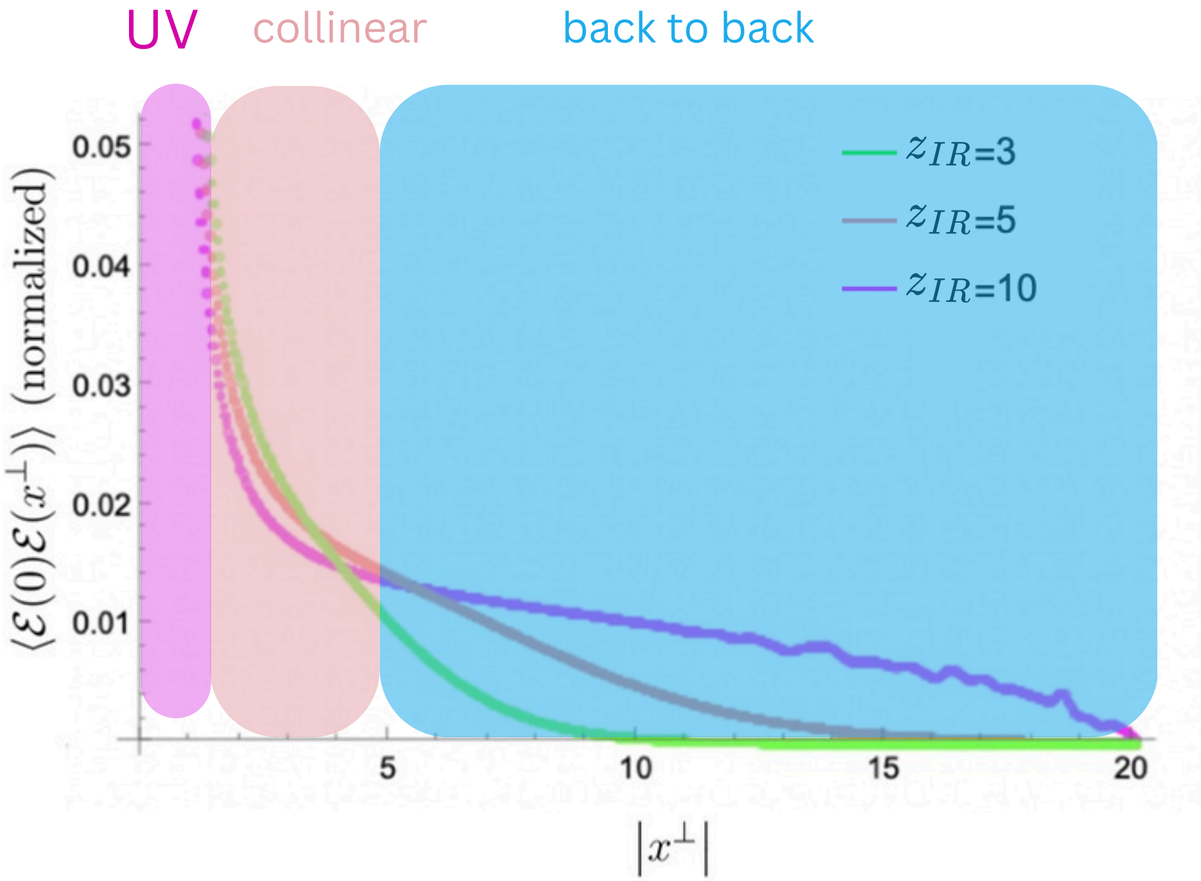
Results





2 different regimes: scaling near small separations and smooth decay for larger separations

Outlook

- The implementation of running reproduces good qualitative behavior of collinear limit (power law scaling)
- Model still raw, need to cook it more : stringy corrections or jets would be interesting next steps
- In order to see collinear limit one may need to include fluctuations in the metric