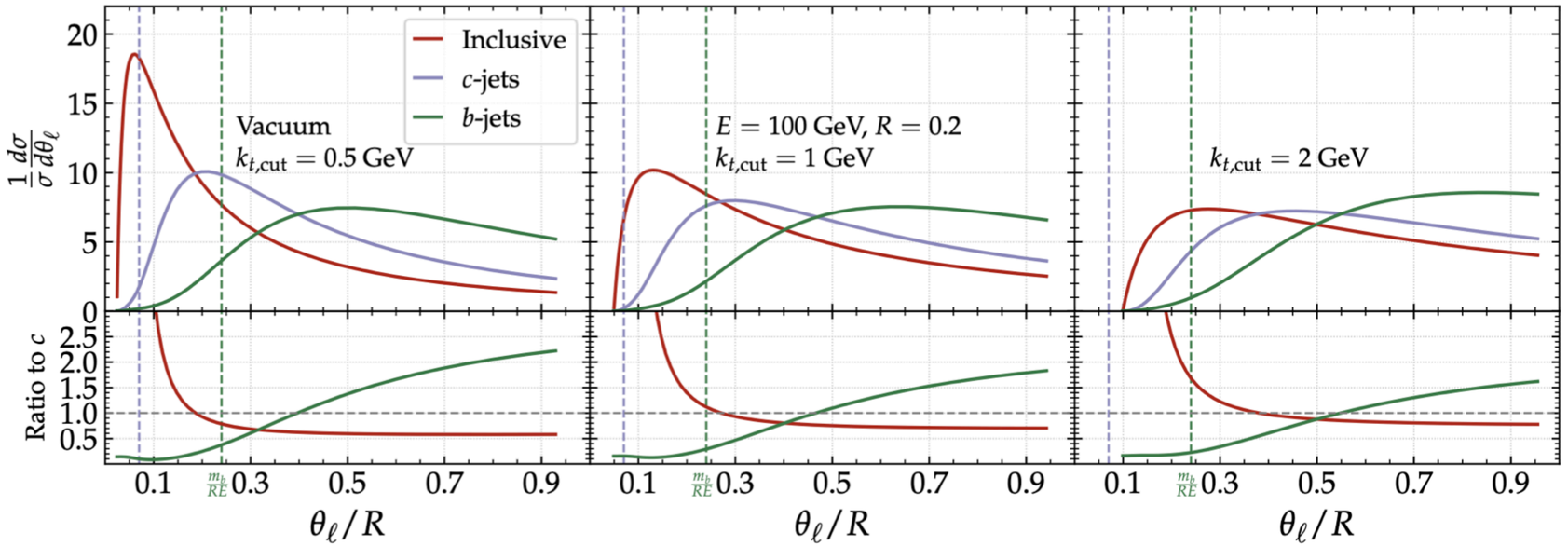
What to measure

γ/Z jet substructure with $x_J \to 0$ to suppress survivor bias. Substructure measurement differnetially in bins of x_J (I've already explained why in my previous talk)

Jet substructure of heavy flavours. In particular, use the dead cone as a clean window where to isolate and characterize QGP-induced signal. *Phys.Rev.D* 107 (2023) 9

The dead cone in heavy-ion collisions using the jet tree

vacuum



$$\frac{1}{\sigma}\frac{\mathrm{d}\sigma}{\mathrm{d}\theta_\ell} = \frac{1}{1-\Sigma(R)}\int_0^1 \mathrm{d}z \mathcal{P}_i(z,\theta_\ell)\Theta(z\theta_\ell - \bar{k}_{t,\mathrm{cut}})\,\Sigma(\theta_\ell),$$

Select **collinear and perturbative** splittings of heavy flavour-tagged jets

Collinear (enhance sensitivity to quark mass effects)

Perturbative (suppress hadronisation)

Measure their angular distribution

Collinear splittings resilient against combinatorial background

Proof of principle: analytical vacuum calculation at modified leading log accuracy
Clear separation power for inclusive, c and b jets
k_T,cut can be optimized: separation power vs suppression of hadronisation
Dashed lines indicate position of the dead cone angle of the first splitting of the jet tree

The dead cone in heavy-ion collisions using the jet tree

Interesting interplay of scales

$$\theta_C < \theta < \theta_{dead}$$

with θ_C the minimal decoherence angle $\theta_C \approx 1/\sqrt{(\hat{q}L^3)}$

The dead cone angle needs to be wider than the decoherence angle for it to be filled with medium emission

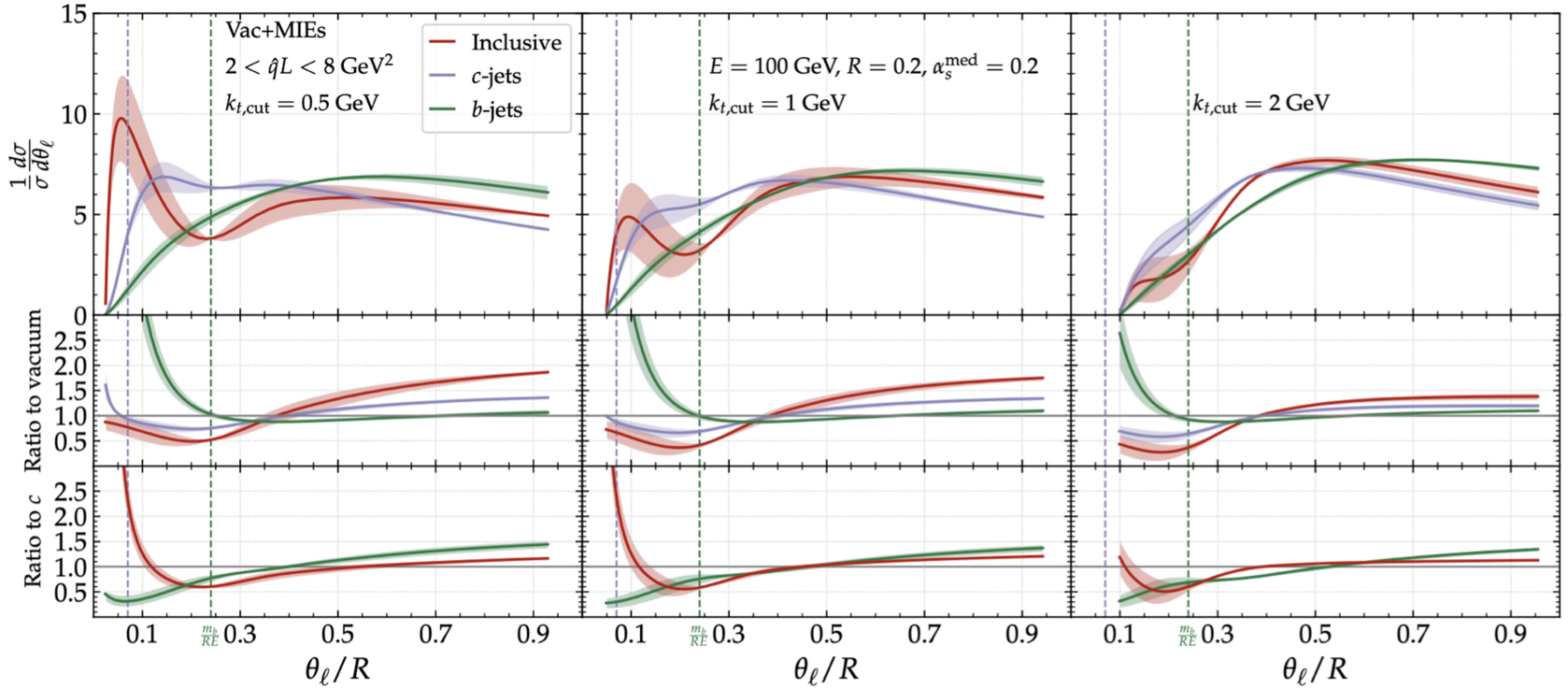
For our choice of parameters, kinematic cuts and approximations:

minimum dead cone angle for D remains intact $\theta_{dead}^{charm} < \theta_C$

minimum dead cone angle for B gets filled $\theta_{dead}^{beauty} > \theta_C$

The dead cone in heavy-ion collisions using the jet tree

medium



$\theta_C < \theta < \theta_{dead}$

QGP-induced signal is expected to fill the dead cone for b-jets. Detectable signal!