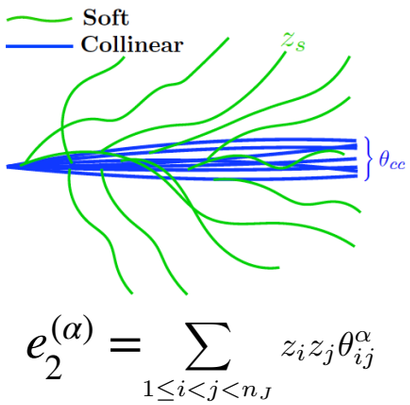
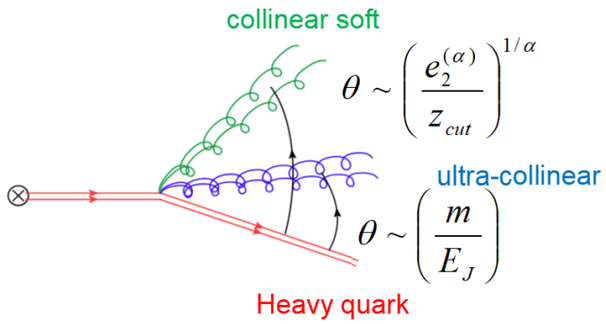
Progress on b-jet substructure in SCET

- Posting paper *tomorrow!*
  CL, P. Shrivastava, V. Vaidya, *"Energy correlators for heavy quark jets,"* LA-UR-18-24853, to be submitted to arXiv and JHEP

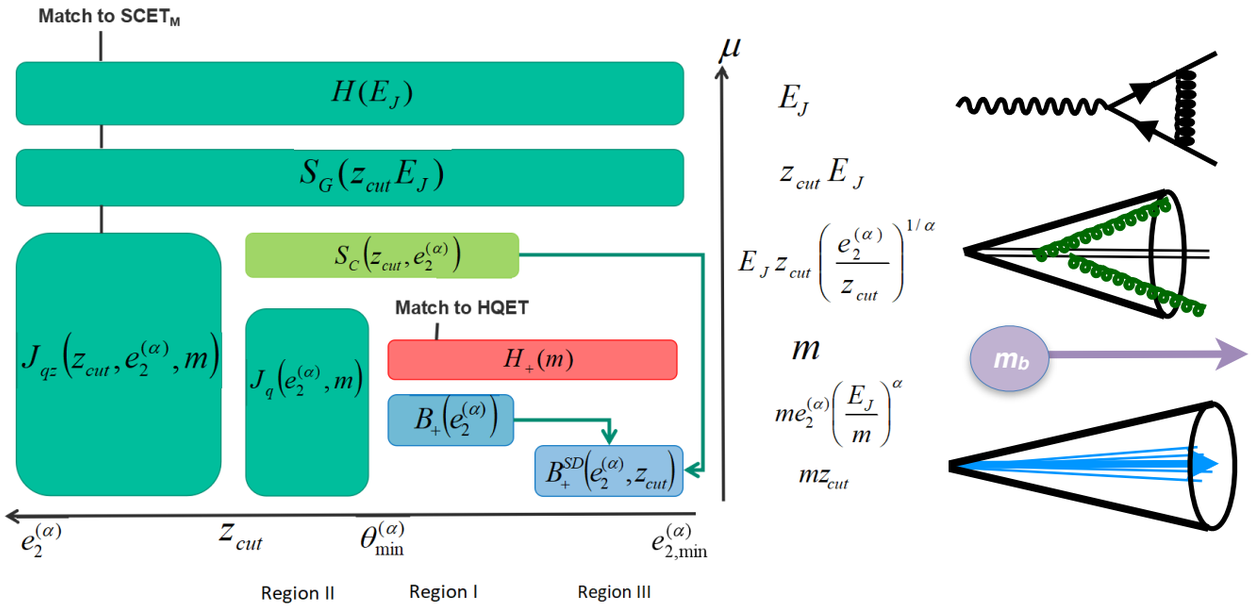
- Predict groomed energy correlators and *B* hadron transverse momenta distributions in *soft drop* groomed jets



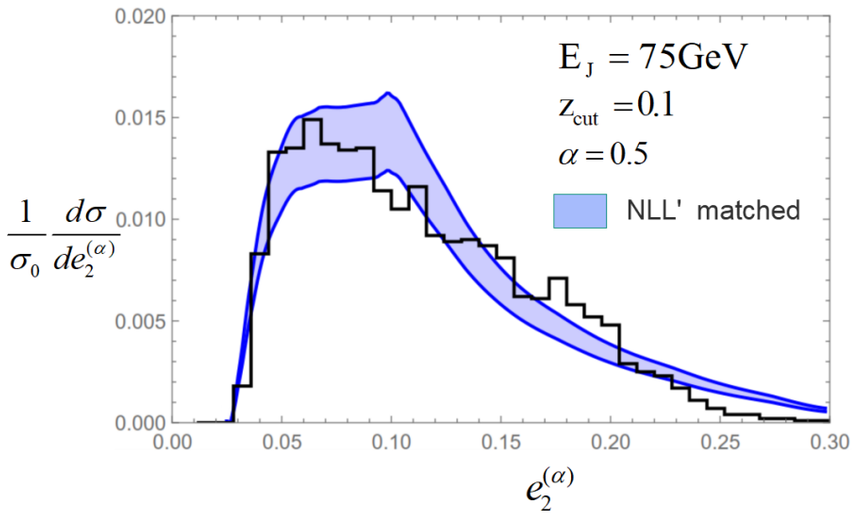
$$e_2^{(\alpha)} = \sum_{1\le i<j<n_J} z_i z_j \theta_{ij}^{\alpha}$$

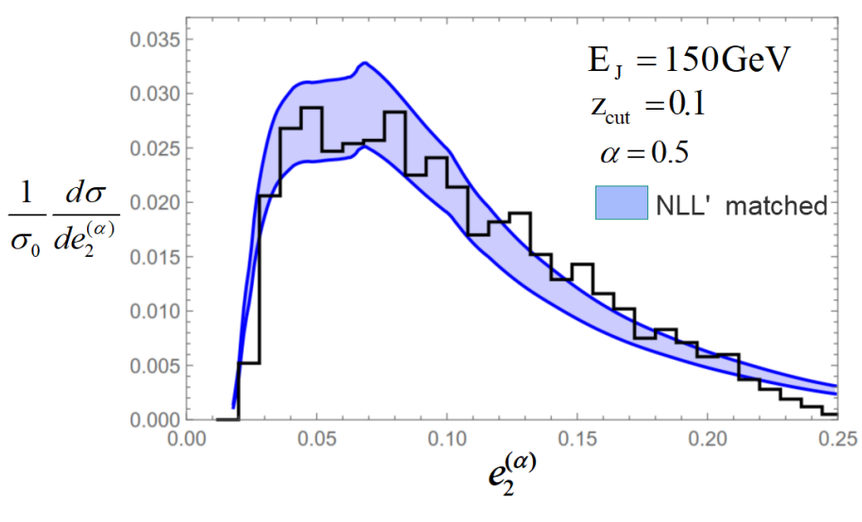


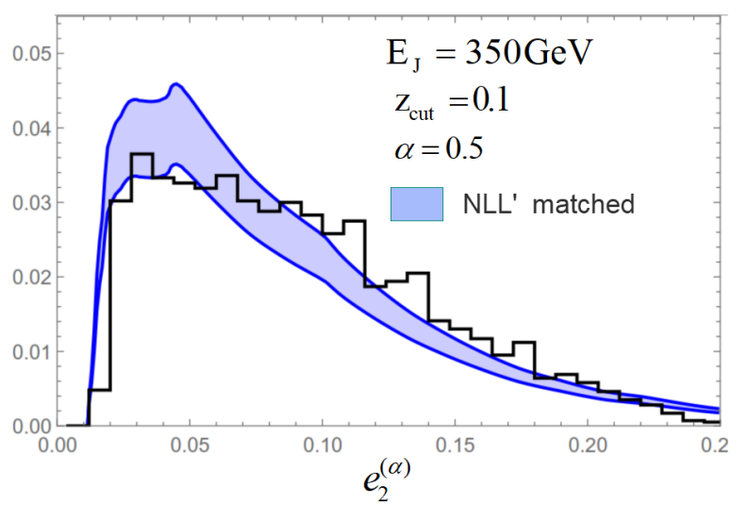
- Constructed EFT for factorization and resummation of all scale ratios in these events:



- Analytic resummed + matched predictions *vs.* Pythia:

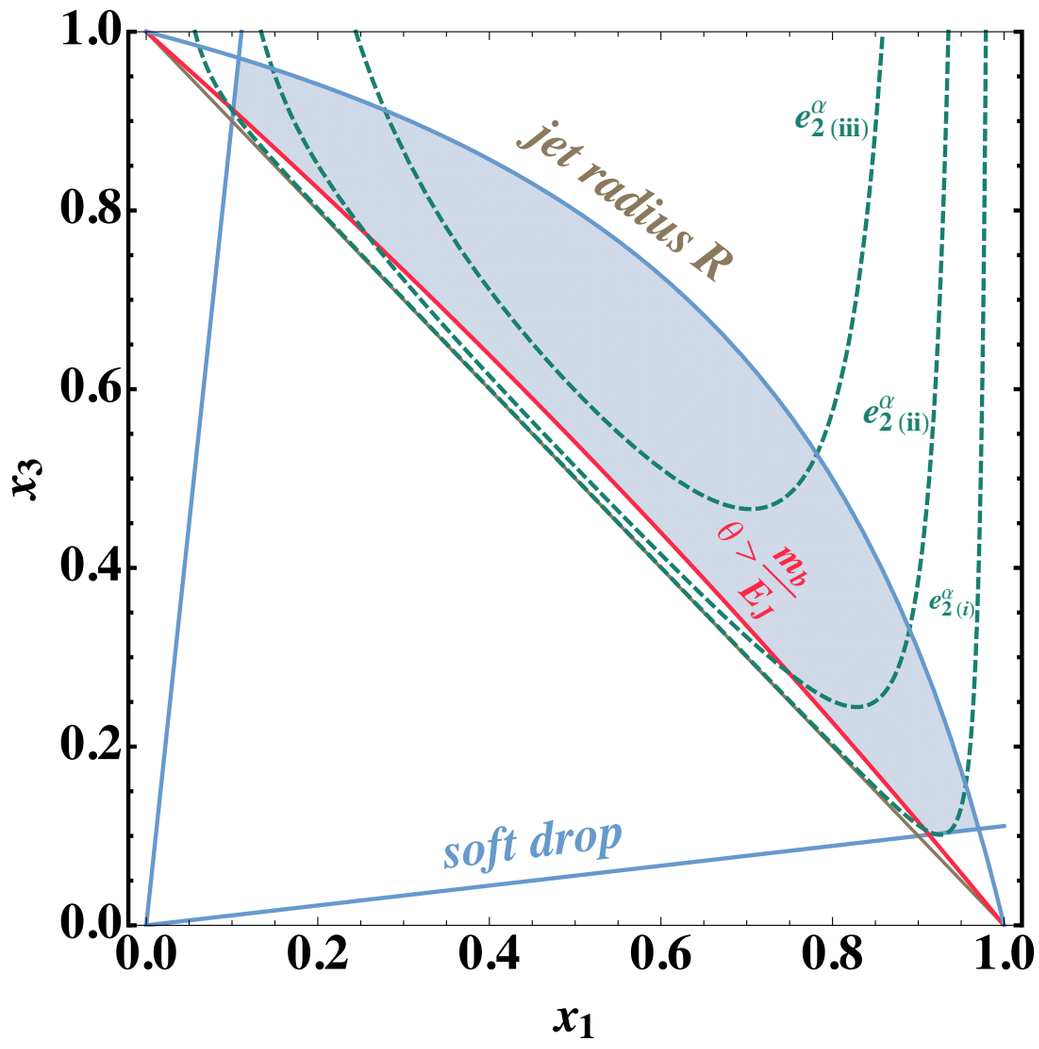




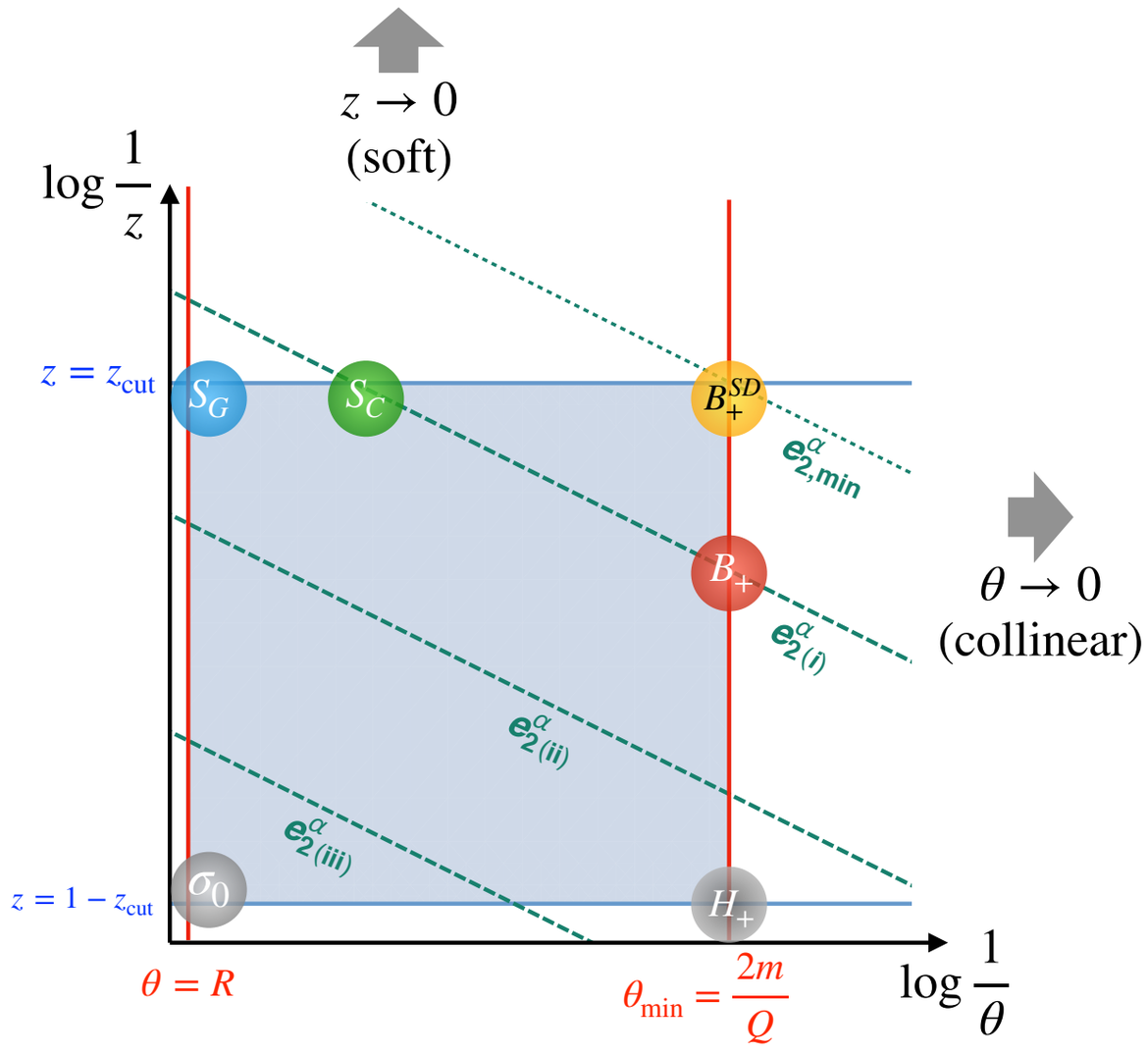


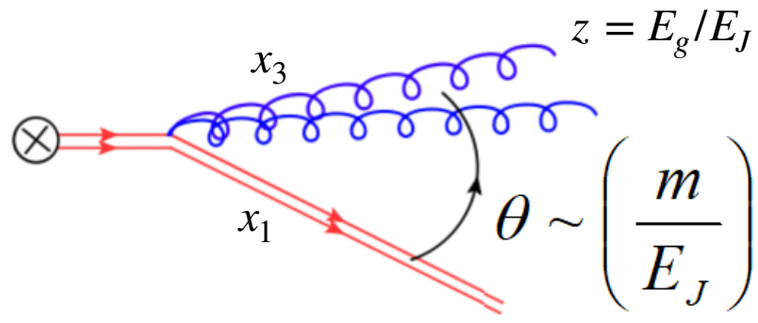
Better understanding of phase space & EFT modes

- In energy fraction x_1-x_3 space:



- In energy-fraction/angle z, θ space:

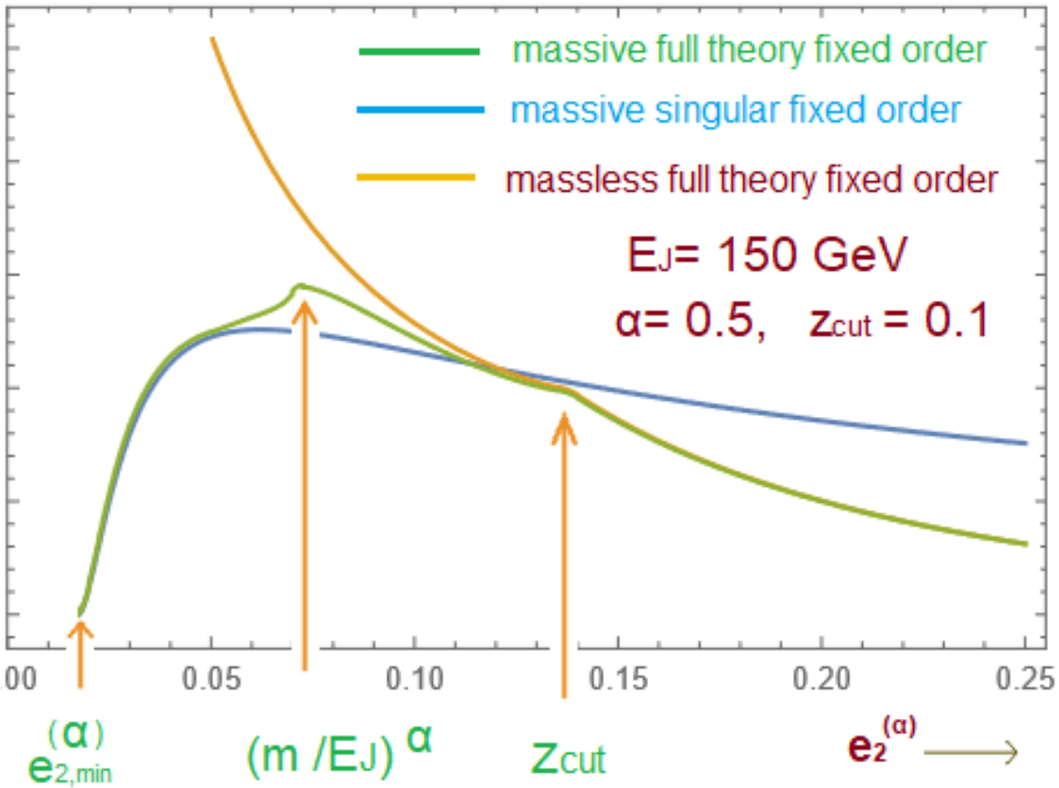




Heavy quark

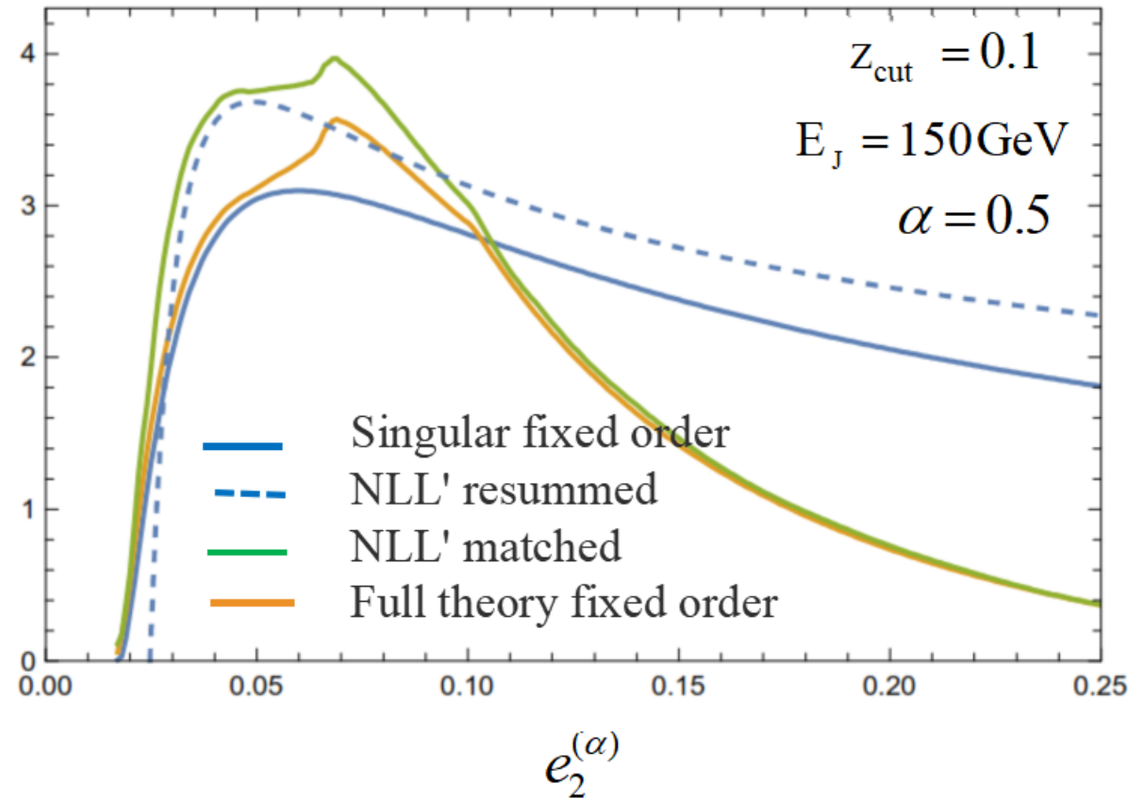
Spectrum shaped by mass and grooming

- Mass / grooming kinks:



- Effect of resummation and matching:

$$\frac{1}{\sigma_0}\frac{d\sigma}{de_2^{(\alpha)}}$$

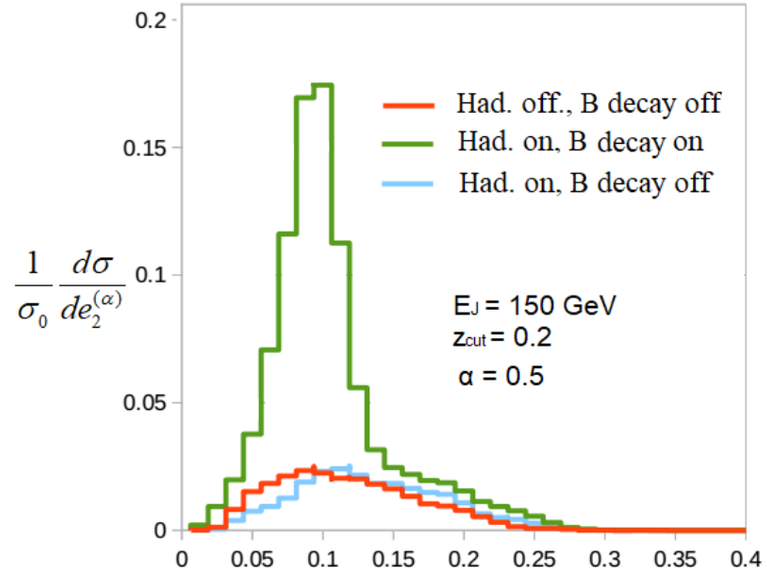


FY19

- Compute effects of *B* hadron decay on energy correlator spectra: will allow their use as a *b*-jet identification tool:

- Implement renormalon subtractions to stabilize perturbative convergence beyond NLL' order: new technique applicable to many finite-*R* jet observables

- Collaborate with Ivan et al. on computing medium effects on these observables, requires inclusion of soft gluon interactions with medium.



- Personnel:
  - C. Lee 25% FTE
  - V.Vaidya 35% postdoc FTE
  - Affiliated collaborators:
    Y. Makris (postdoc DOE EC + quarkonium ER), D. Neill (RPF)