Jets: New opportunities

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Physics issues

- Ever increasing focus on jet substructure:

    Is this the correct direction to go ?

    What do we expect to learn from this?

- In many cases this involves understanding energy deposition and local thermalization. No good theory so far ?

- Can there be a directed effort in this direction, general principles for a J^μ, are there new transport coefficient, e.g., Kubo formula, OPE ?

- How to understand the transition region between pQCD & hydro?

- How to extend these to EIC systematics, via pA, UPC ?

- To assess sensitivity of observables to specific QGP properties, need better phenomenological calculations. This is a lot harder than it sounds

- What about classical observables (R_{AA} & v_2) and sensitivity to QGP properties?
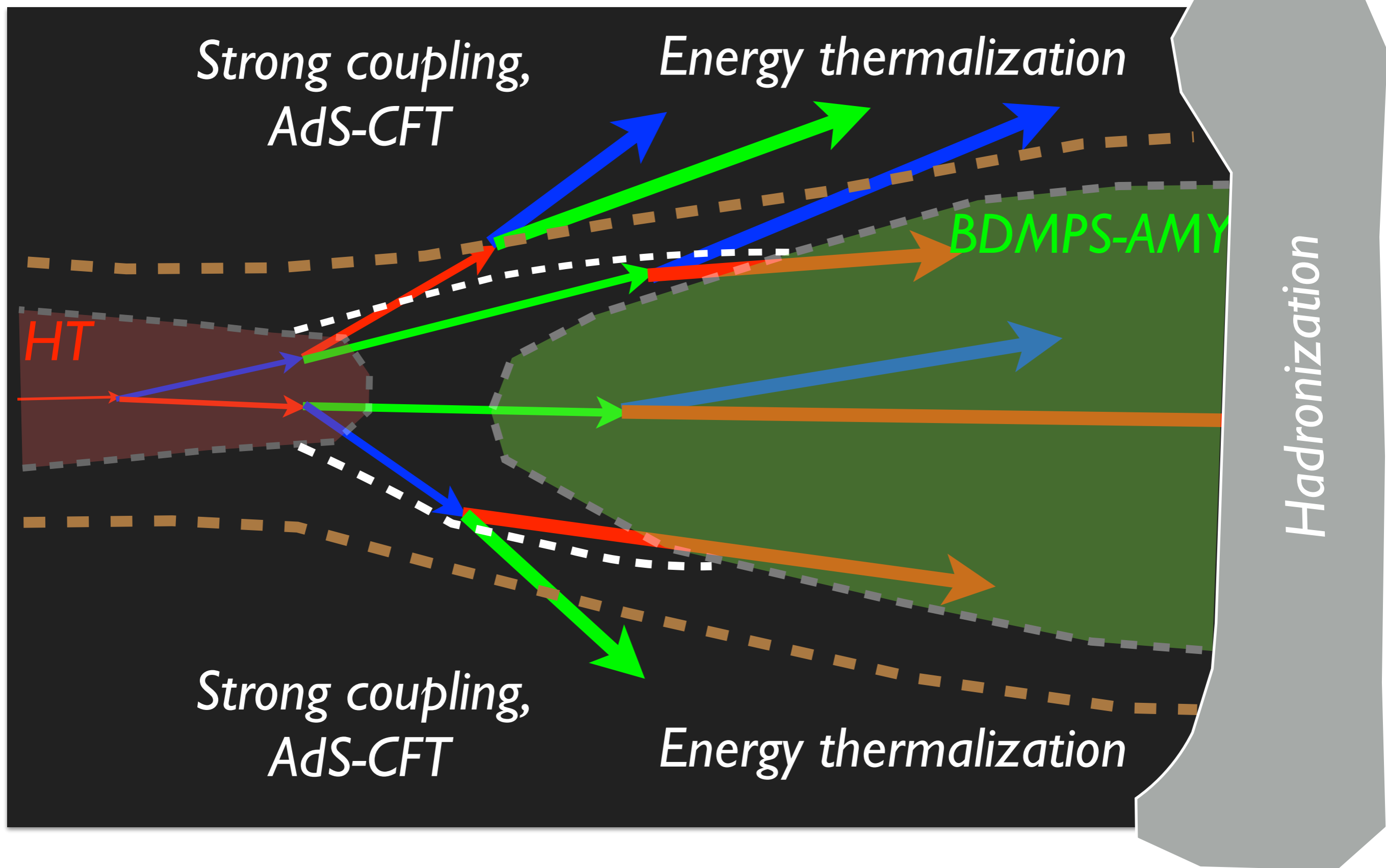
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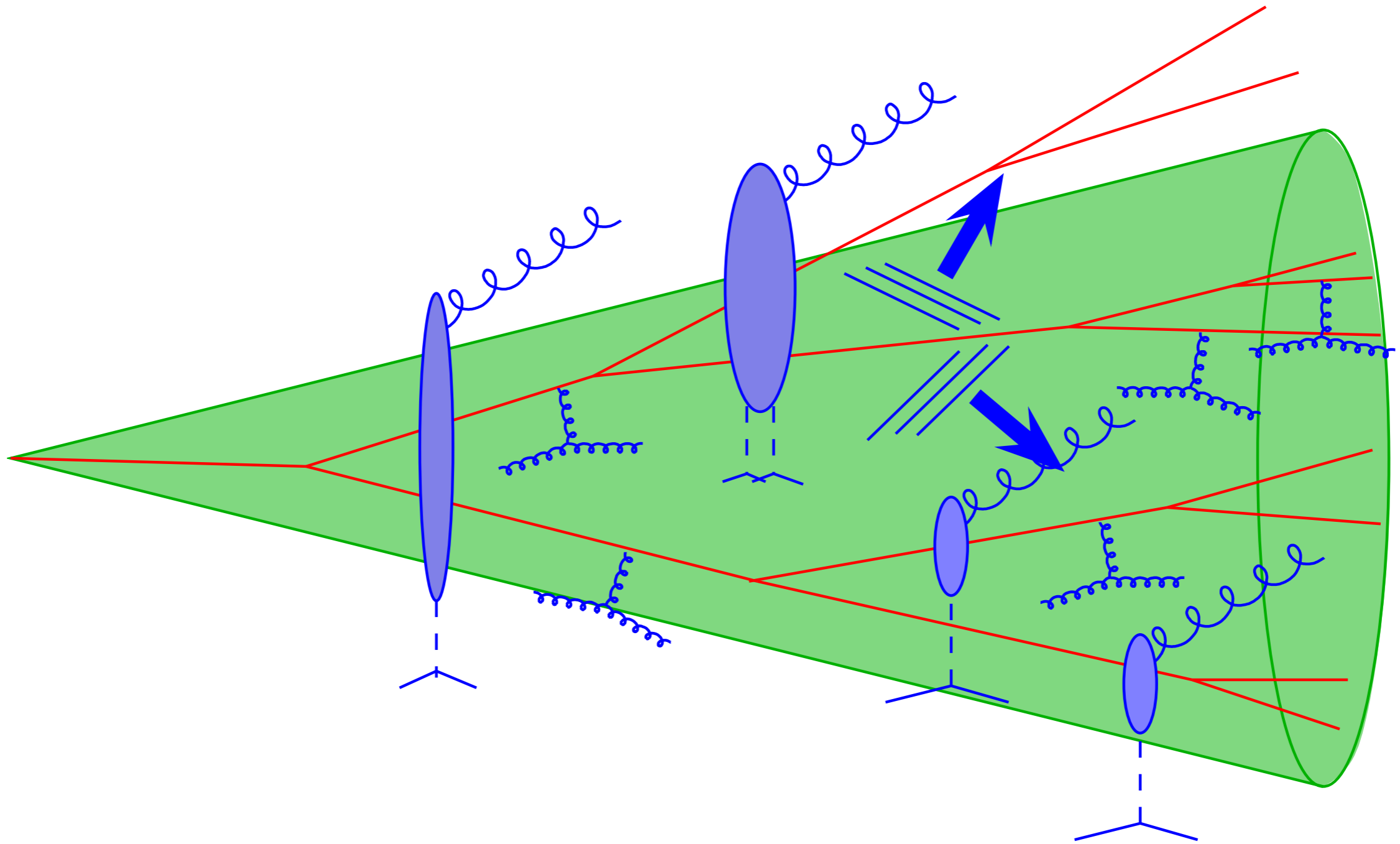
Overarching issues with computation

- What can be done jointly by theorists and experimentalists to identify new sensitive observables.

- increasingly complex/detailed observables need to be matched by TH/PH tools and EXP/PH-TH comparisons, need standardization

- Search for simpler observables amenable to direct theory calculations. (may be a long winding road to these)

- on-going efforts need wide community acceptance and support

- What can be jointly (expt. & th.) done in preparation for future LHC/RHIC runs and sPHENIX?

- Standardization
  Lisbon Accord : a minimal set of standards for automated EXP/PH-TH
   comparisons
  JETSCAPE

- JETSCAPE: Jet Energy-loss Tomography with a Statistically and Computationally Advanced Program Envelope
- A modular framework:
  which sets up initial state (user defined/generic algorithm),

- produces partons from initial overlap (UD/GA),

- propagates and splits them (UD/GA),

- deposits and redistributes energy momentum (UD/GA)

- hadronizes bulk and jets (UD/GA)

- Compares results to all available data with Bayesian methods.

- Open source, both framework and recommended add-ons.

Can extensive data rule out a wrong theory?

- Note: MonteCarlos often does not contain all relevant physics

- should not be a major penalty for dropping a feature, to ensure a swifter roll out! Only to be reintroduced later as an enhancement.

- These are not major departures, but incremental enhancements in application.

- Some theories have too many parameters and too flexible

- What should a theory be applied to and what should it not be applied to?

- Can the community set down general principles on how to ``objectively'' decide on better vs. worse modeling

- Can these be coded and documented into event generators