# Charting QCD jet evolution in extreme conditions

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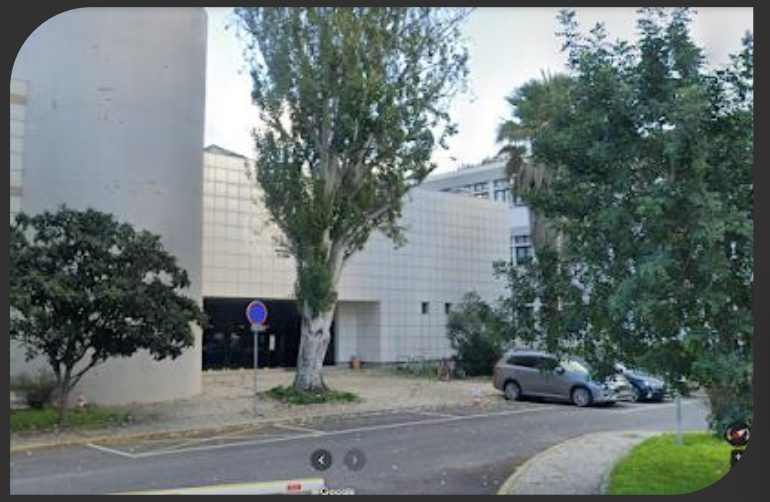
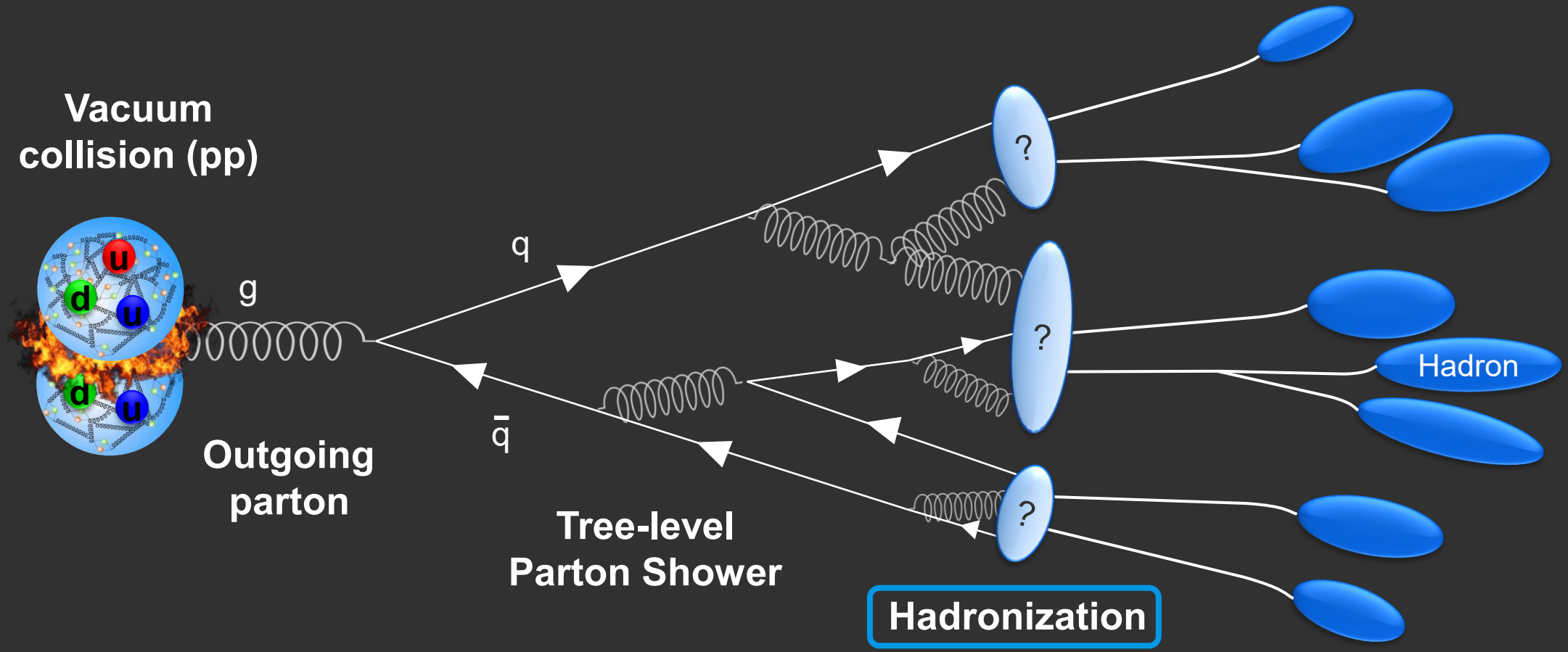
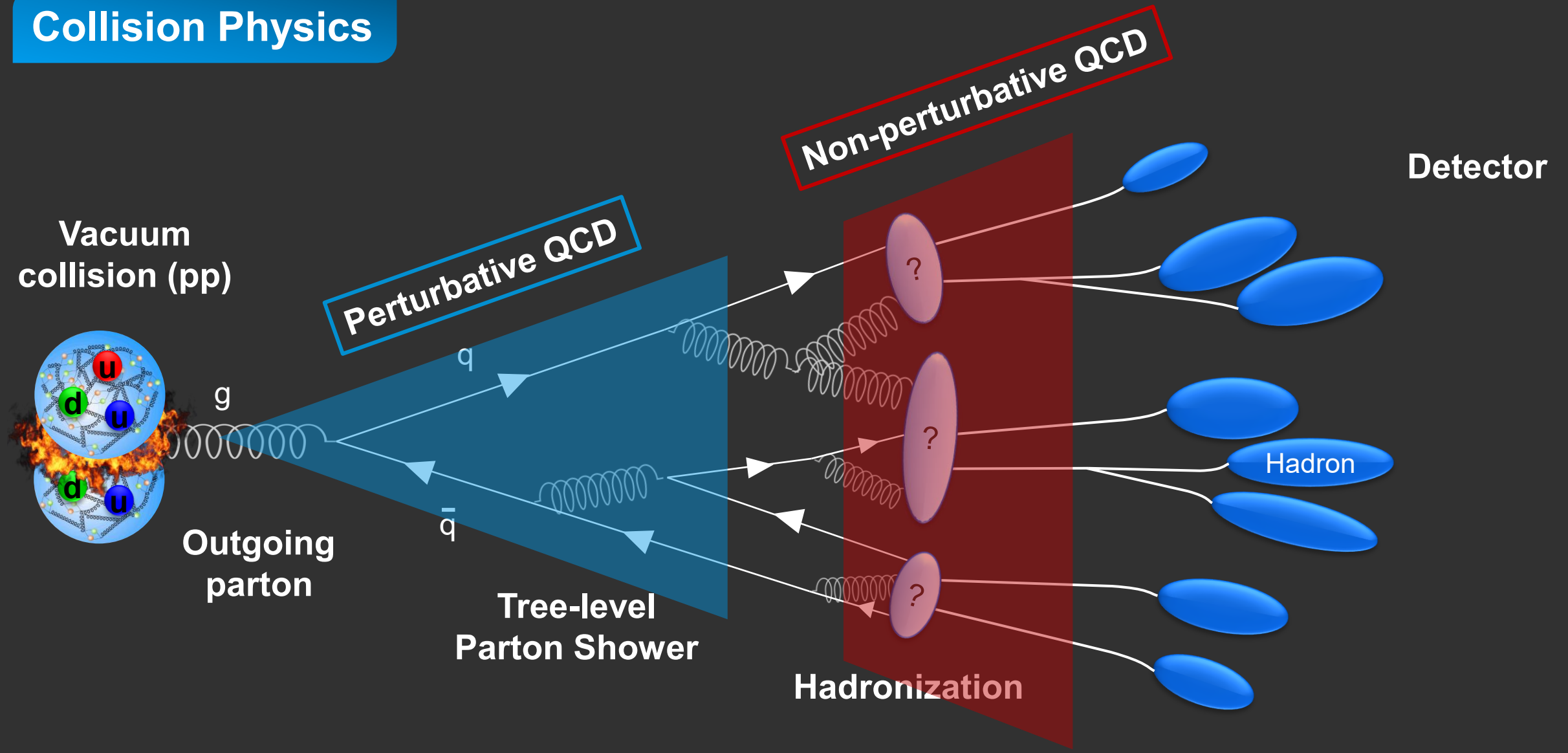


LIP

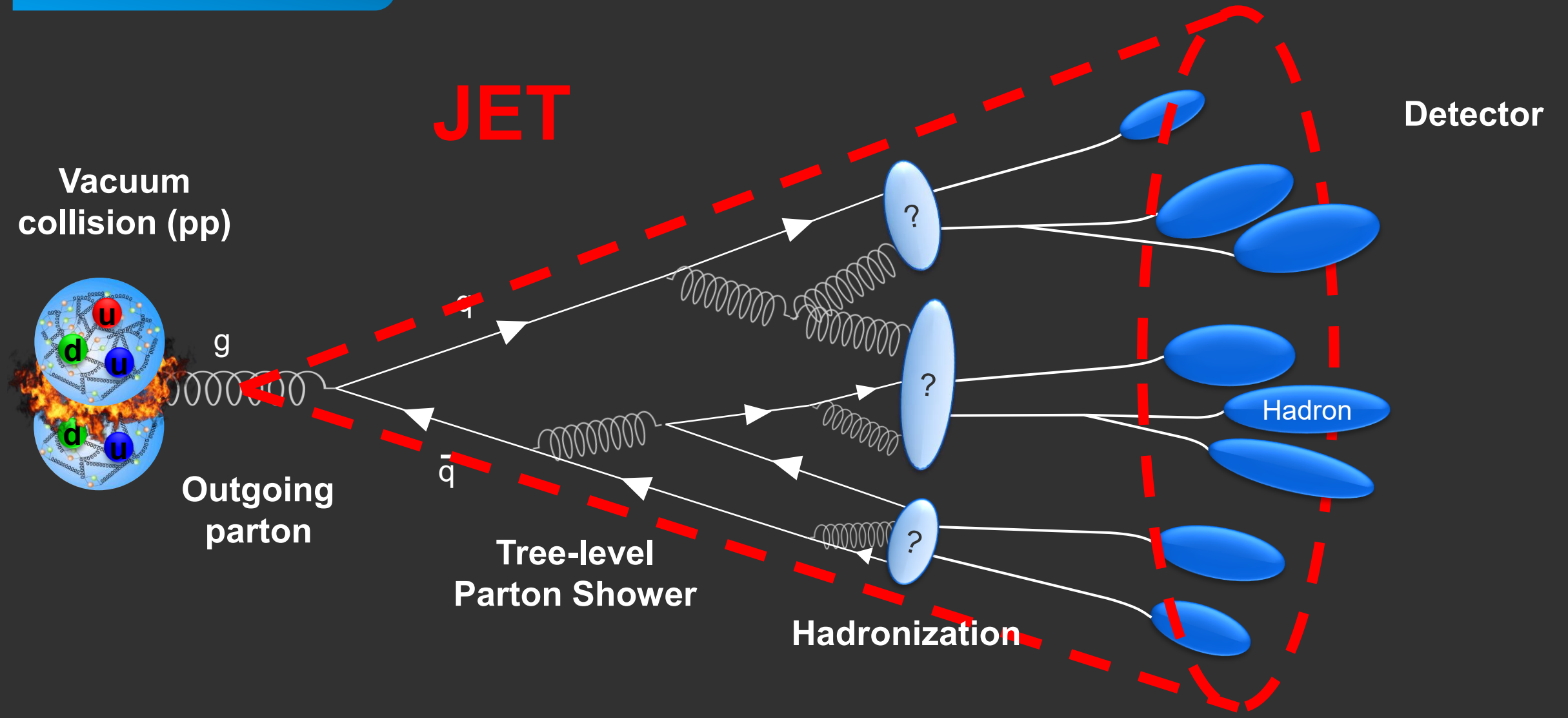
# Collision Physics



# Collision Physics

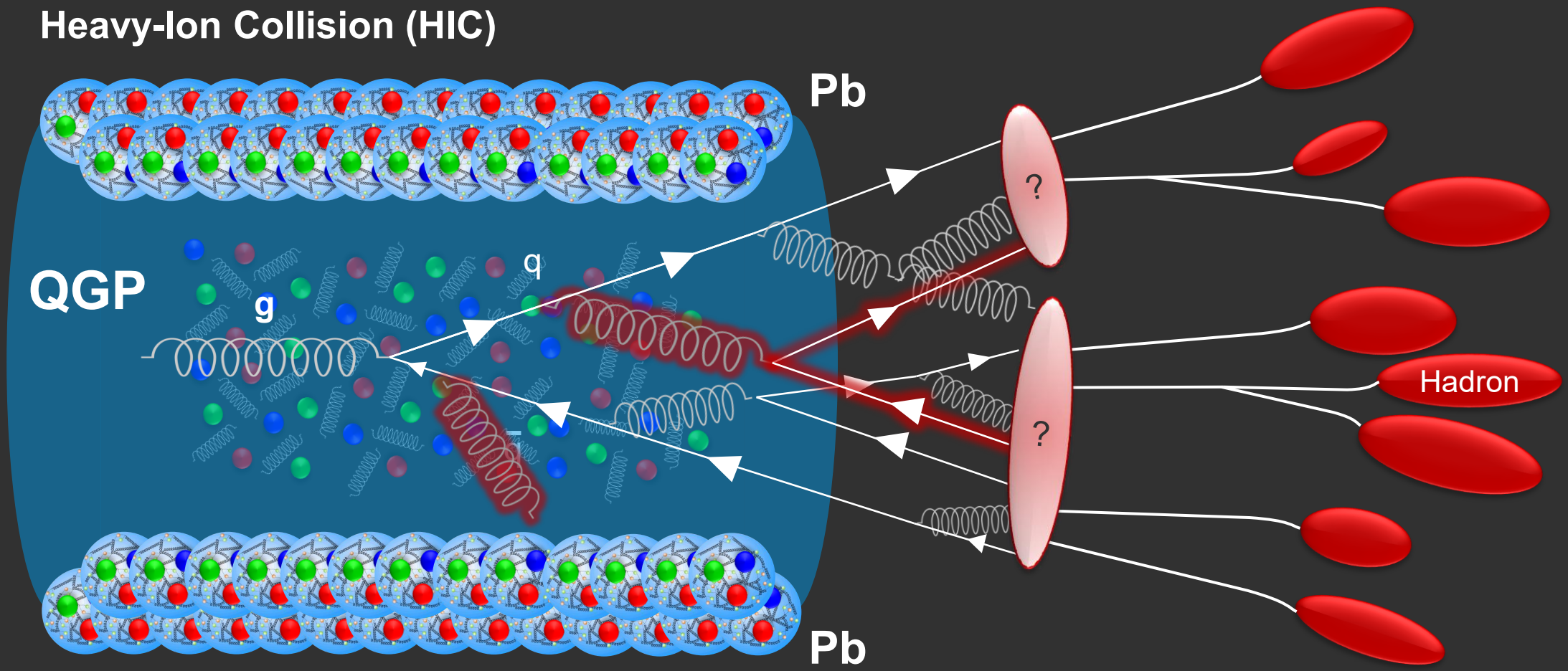


# Collision Physics




➢ How can we disentangle the effects at play at different momentum and energy scales in a jet?

# QGP – Quark-Gluon Plasma

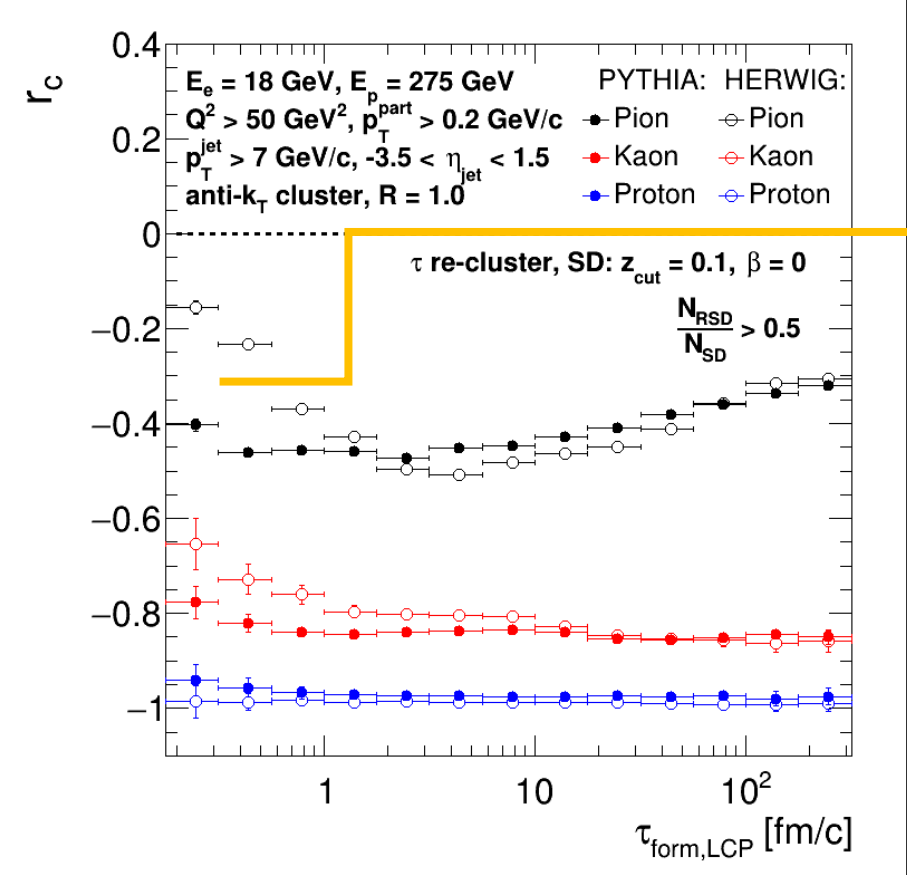



- **Can we isolate modifications introduced by the QGP into HIC jets and extract properties of the QGP itself?**

# Past Research

- **Experimental observable only sensitive to the hadronization mechanism (later stages of the jet showers);**

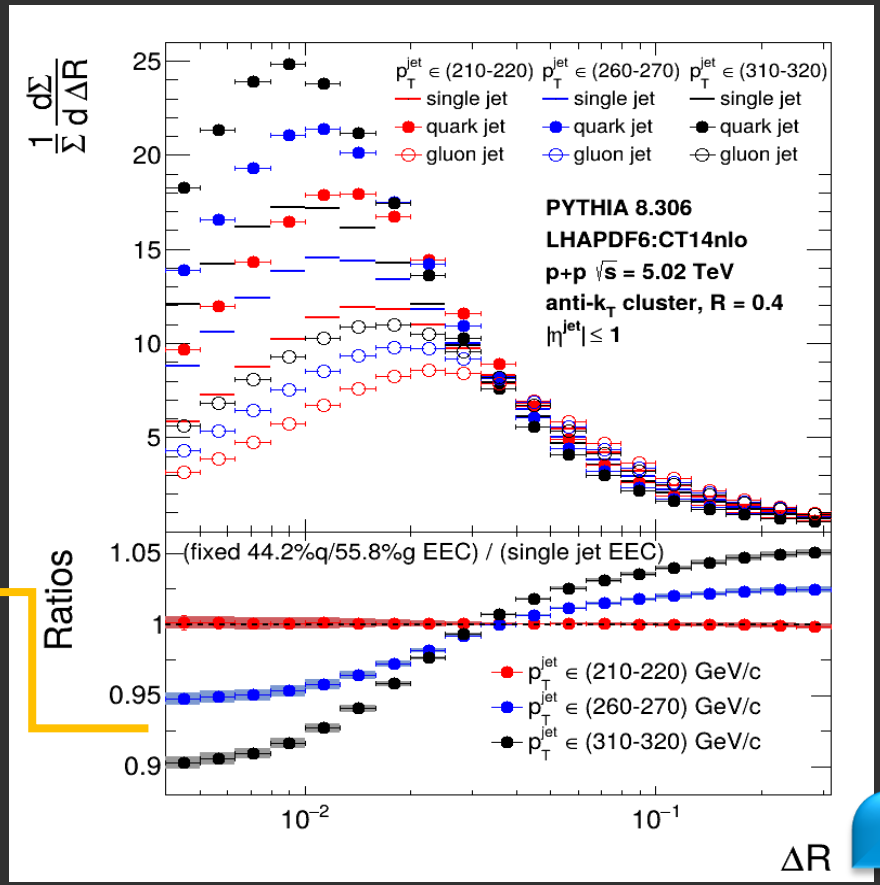
Paper in: [Phys. Rev. D 111, 034008]




Clear separation between hadronization models

- **Uncovering the role of the quark/gluon flavor for energy loss studies in the quark-gluon plasma (QGP);**

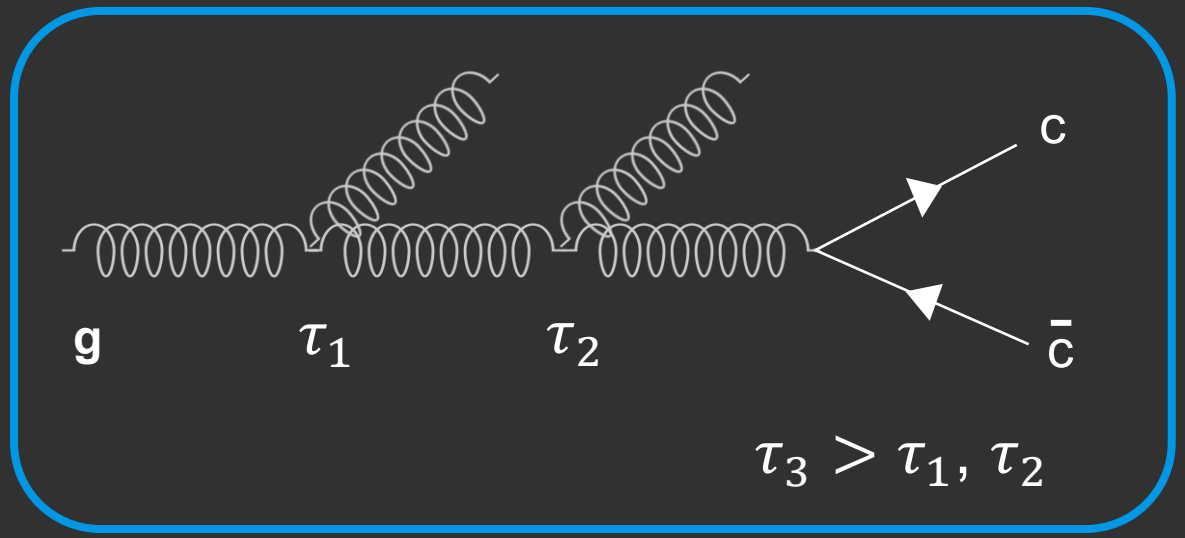
Paper in: [arXiv.2502.11406]



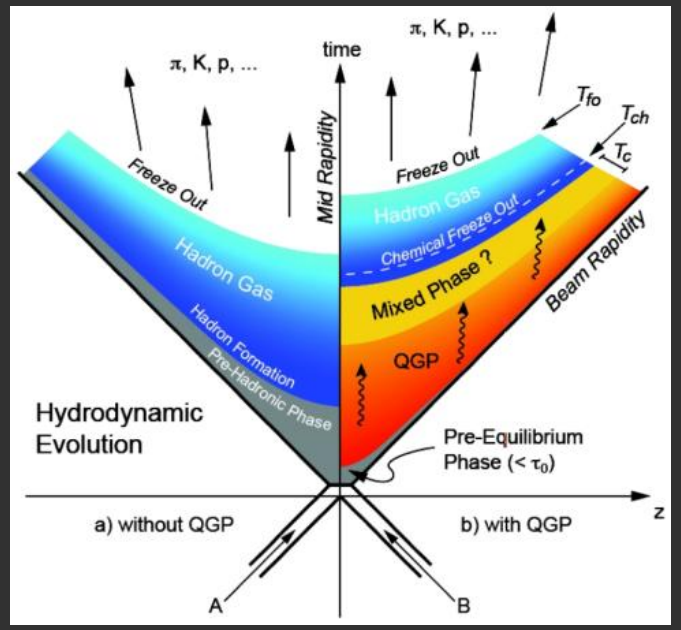

Clear flavor (q/g) dependence on the jet flavor

# Current and Future Research

- Perturbative calculations of formation time usually apply to the earliest, highest-momentum splittings from the jets;
- We will study jets with heavy-flavor gluon splittings, namely $g \to c\bar{c}$, as they give us access to later times while still behaving perturbatively;




- Dominant description of the QGP is based on the QCD Lagrangian, encoding dynamics in momentum space;
- We will explore the Hamiltonian approach to describe the problem in coordinate space, likely to provide a better framework to derive the space-time structure of the QGP;



# Thank you for your attention!

## Questions?

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