

High Priority Jet Quenching Observables

ECT*

EUROPEAN CENTRE FOR THEORETICAL STUDIES
IN NUCLEAR PHYSICS AND RELATED AREAS

Yen-Jie Lee



New jet quenching tools to explore equilibrium and non-equilibrium dynamics in heavy-ion collisions

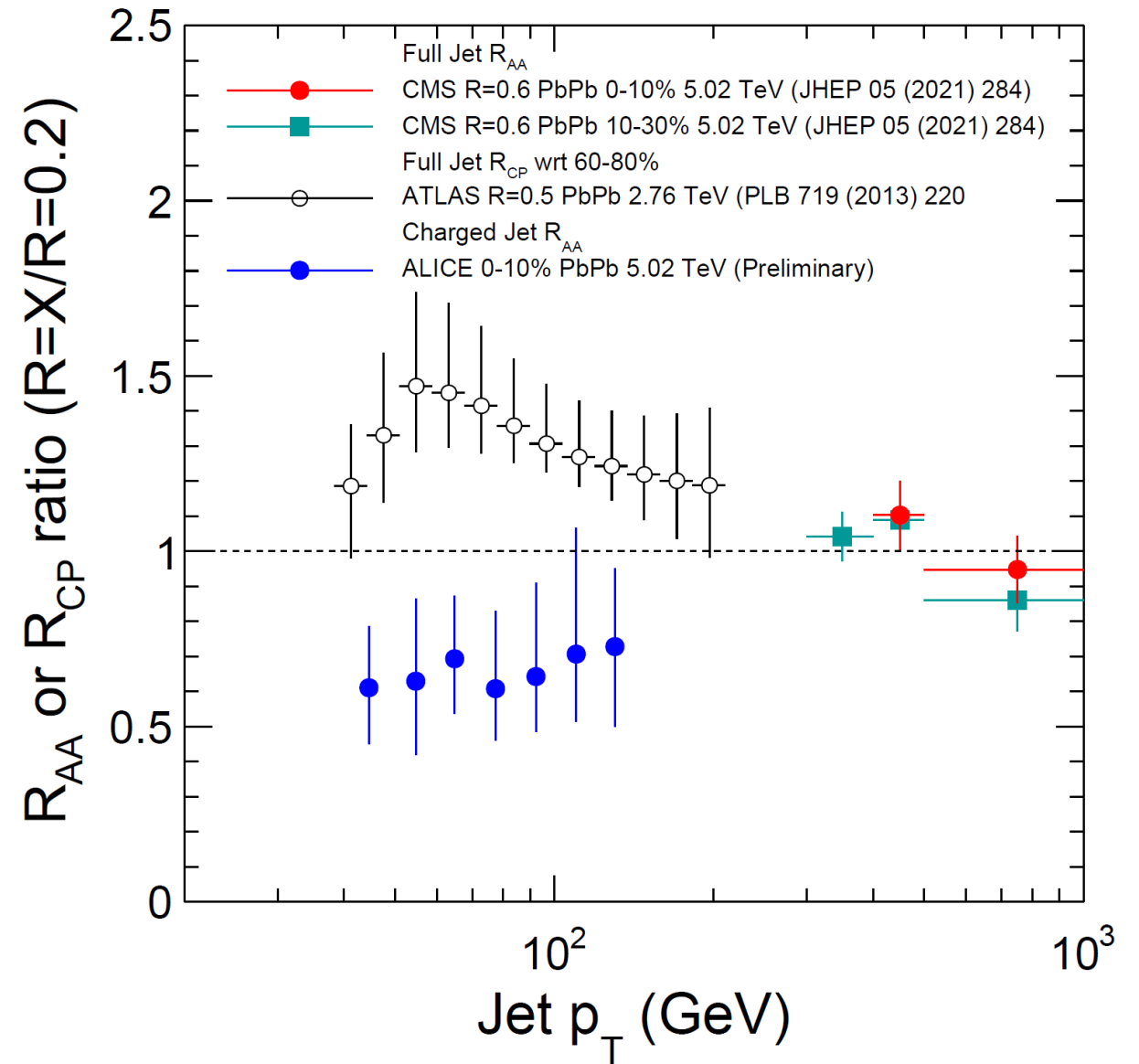
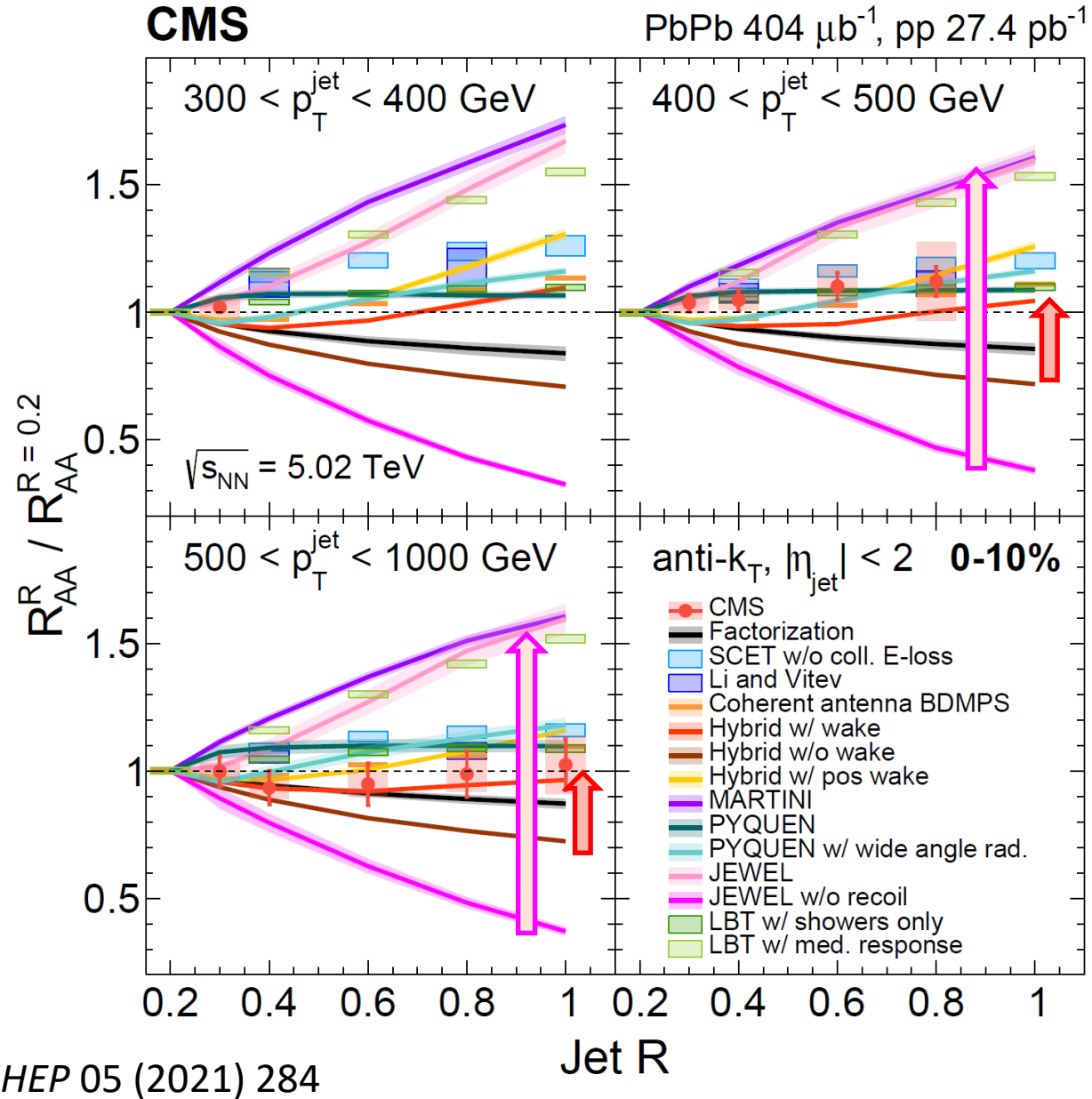
ECT*, Trento, Italy

12th February, 2024



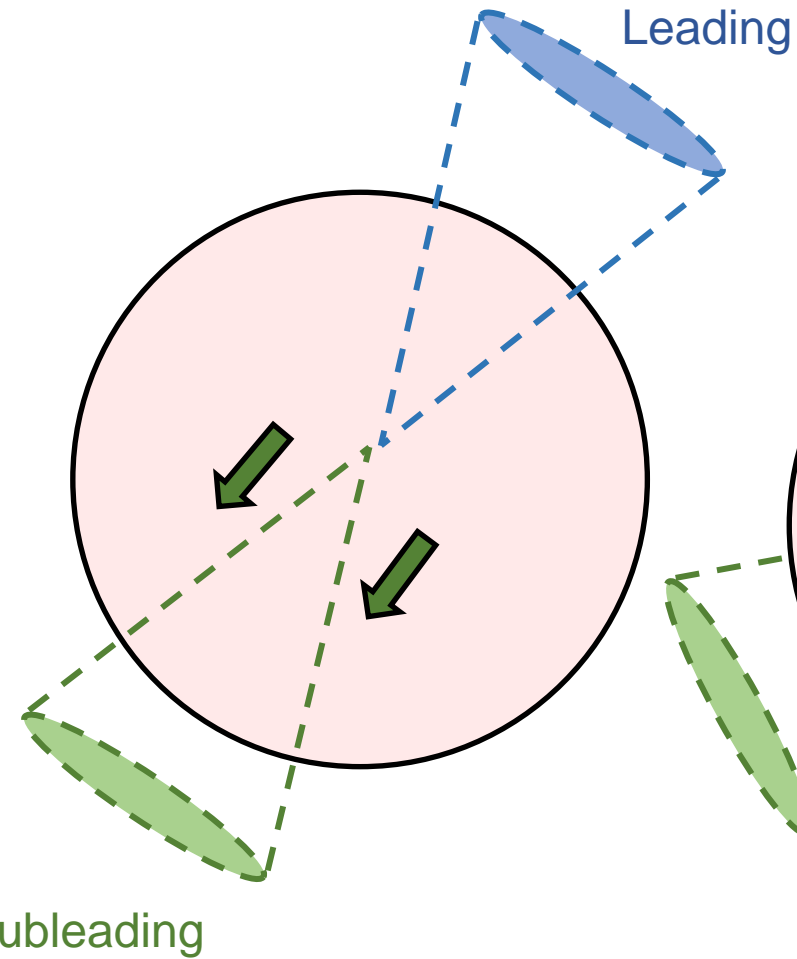
MIT HIG group's work was supported by US DOE-NP

Follow Up with the Large Area Jets

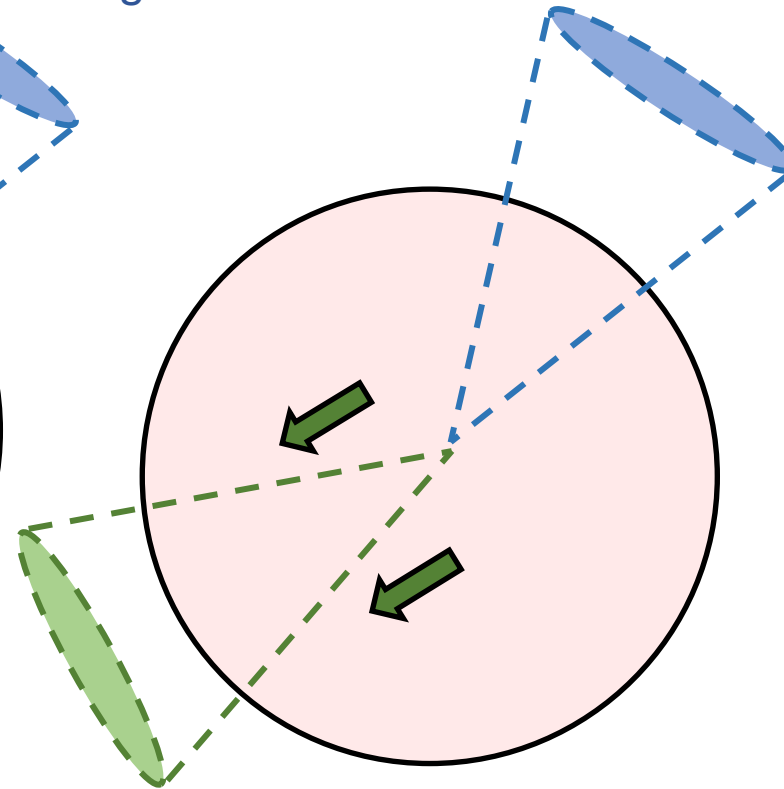


Reveal the Negative Wake Contribution

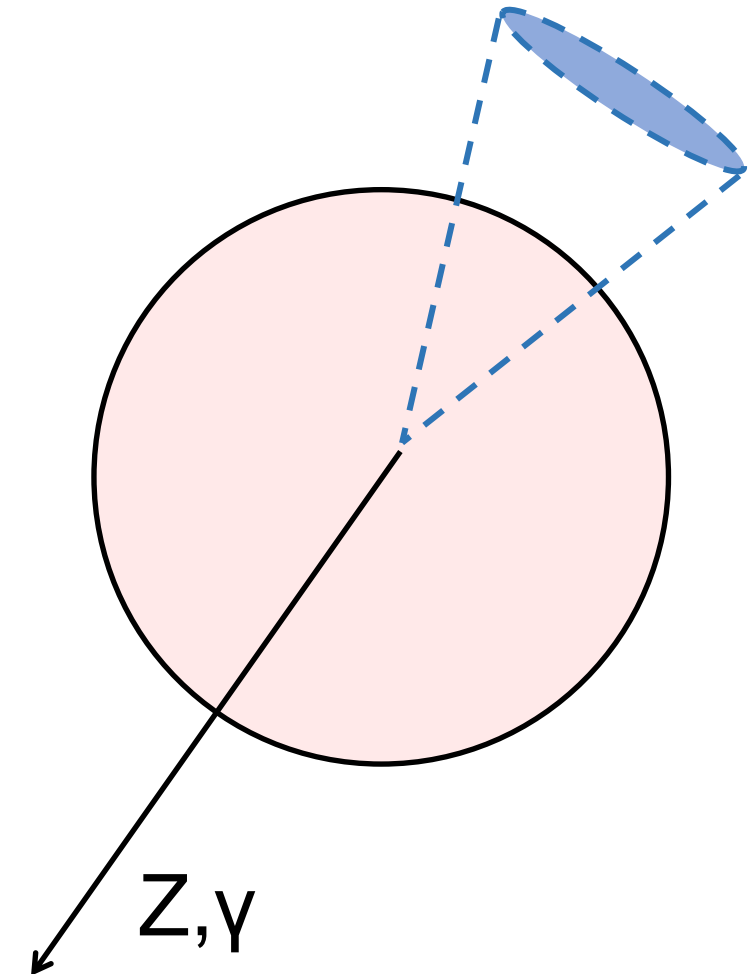
Receive back reaction effect from the **away side jet**



Receive **partial** back reaction from the away side jet



No back reaction from the electroweak boson

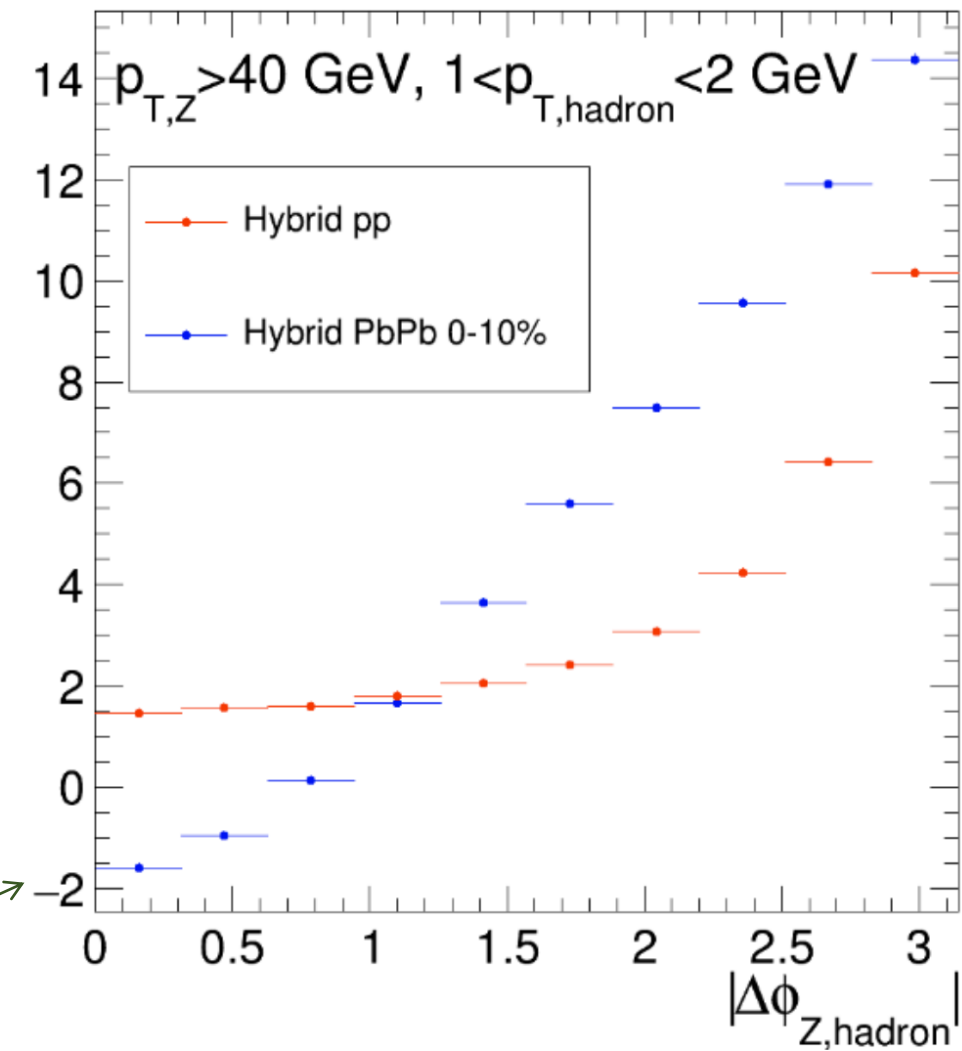
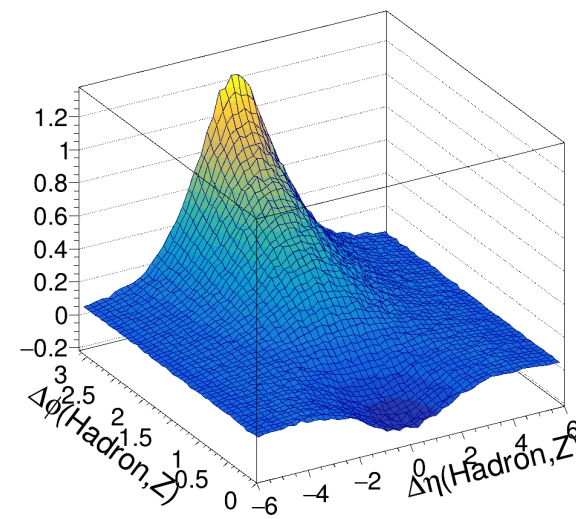
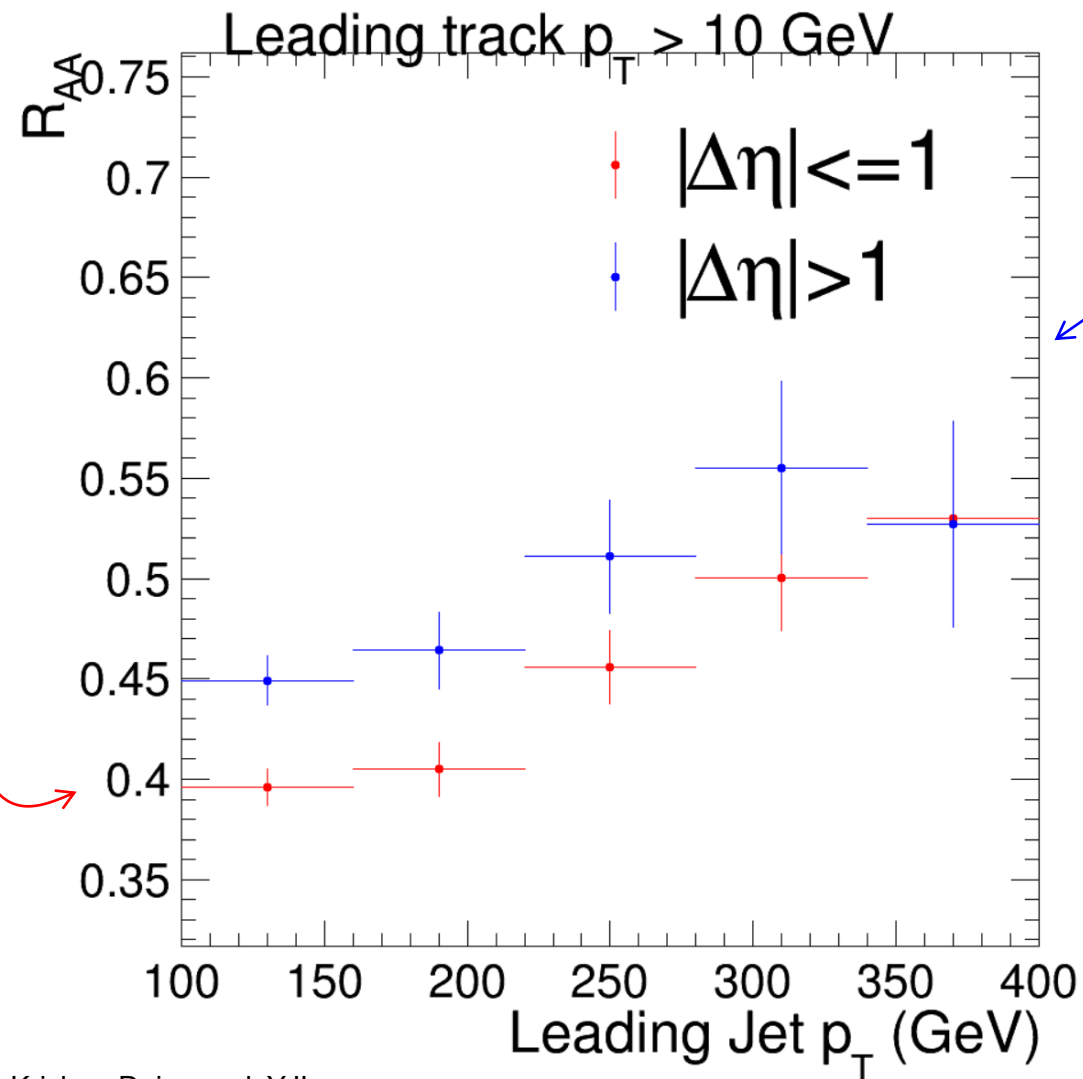


Reveal the Negative Wake Contribution

Receive back reaction effect from the **away side jet**

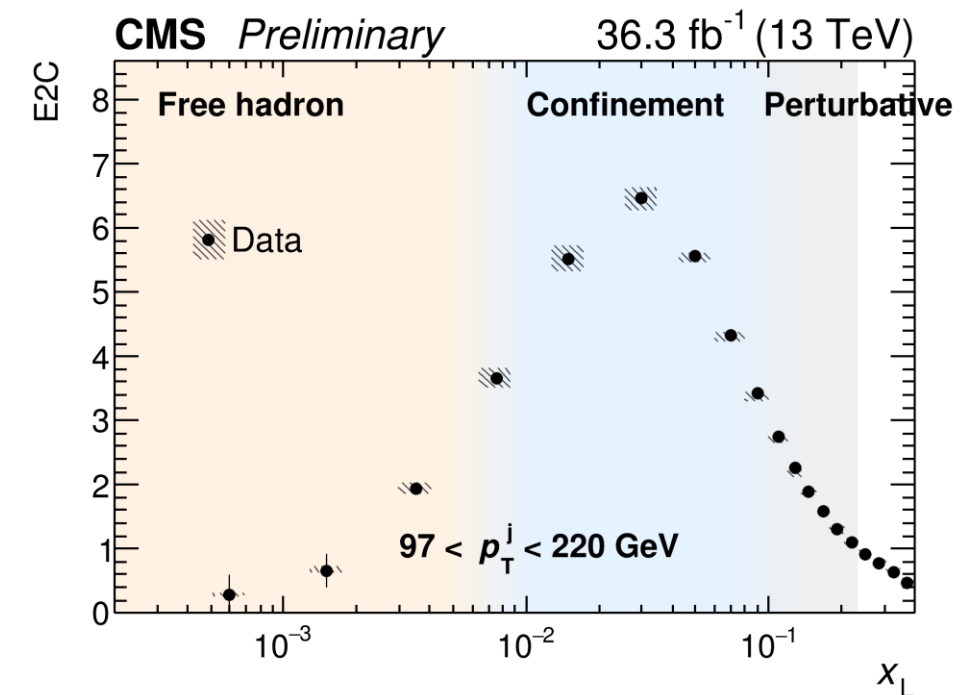
Receive **partial** back reaction from the away side jet

No back reaction from the electroweak boson



Precise Measurement of Photon/Z-tagged Jet Substructure

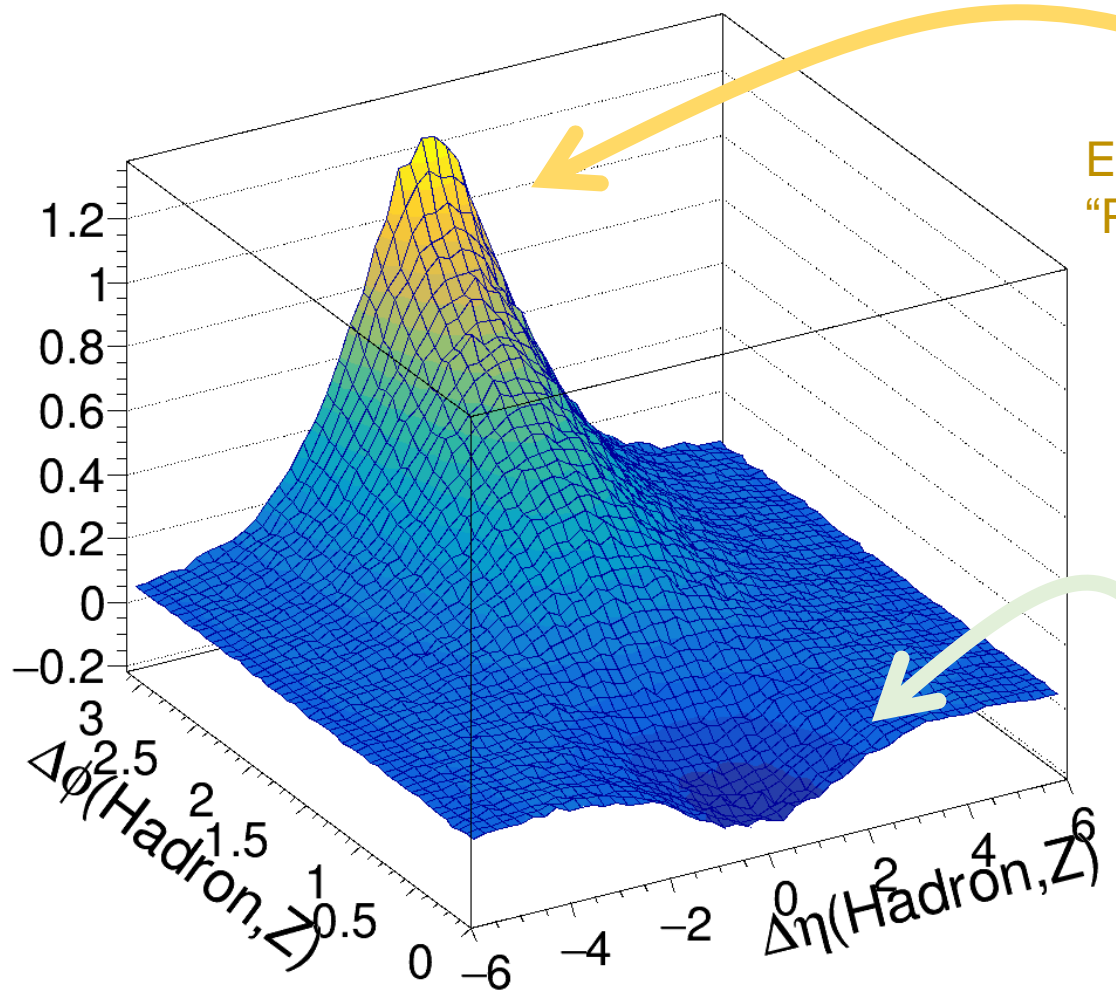
- Inclusive jet substructure studies show jets are narrowing, offering detailed insights per jet, advance from jet shape and FF. However, the measurements are significantly affected by selection bias.
- Highest priority on substructure observables that reduce survival-bias.
- Linking the initial virtuality of parton showers to jet measurements with **(photon/Z)-jet** or parton-shower based tagging for **inclusive jet**.



Backup slides

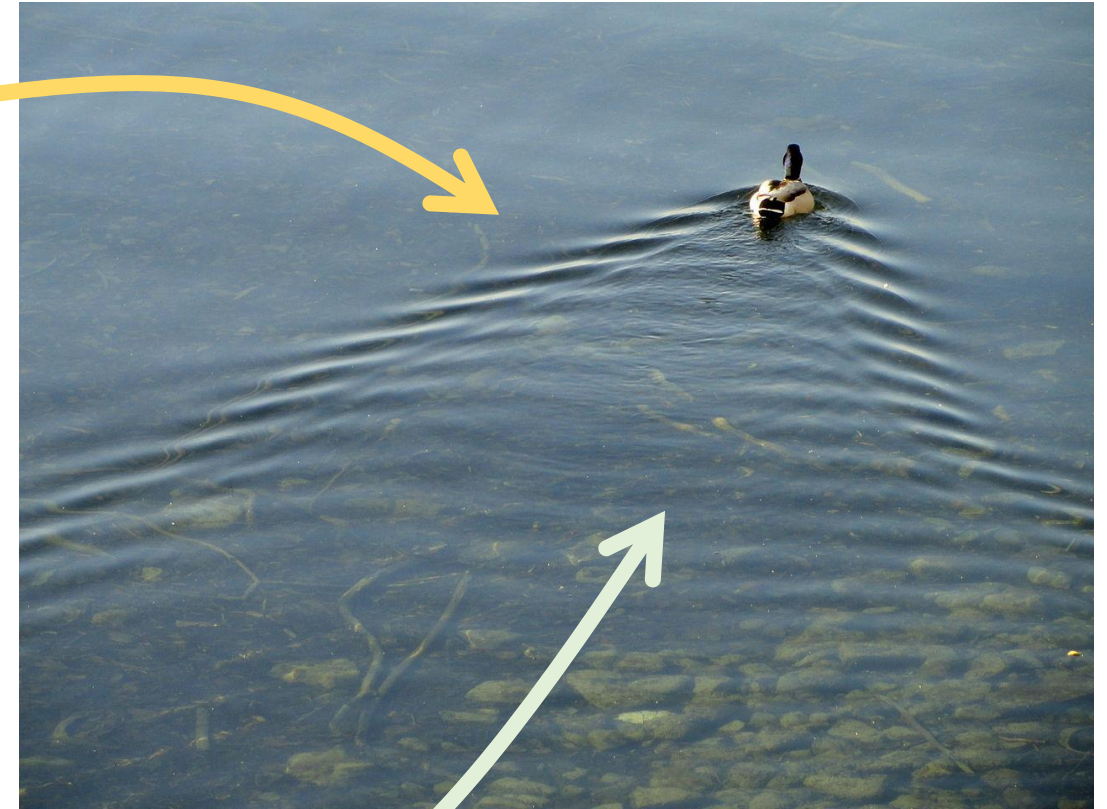


Reveal the Negative Wake Contribution



Enhancement of particle
"Positive wake"

Depletion of particle
"Recoil"
"QGP hole"
"Negative wake"



Position space

Z^0 and wake hadron correlation in Hybrid model

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Momentum space