Contribution ID: **239** Type: **Poster**

# 3D structure of jet-induced Mach cone in an expanding QGP

*Tuesday 5 September 2023 17:30 (2h 10m)*

Jet-induced medium response is in the form of Mach-cone-like excitation. Diffusion wake accompanying this Mach-cone provides a unique probe of the properties of quark-gluon plasma in high-energy heavy-ion collisions. It can be characterized by a depletion of soft hadrons in the opposite direction of the propagating jet. We explore the 3D structure of the diffusion wake induced by $\gamma$-triggered jets in Pb+Pb collisions at the LHC energy within the coupled linear Boltzmann transport and hydro model. We identify a valley structure caused by the diffusion wake on top of a ridge from the initial multiple parton interaction (MPI) in jet-hadron correlation as a function of rapidity and azimuthal angle. This leads to a double-peak structure in the rapidity distribution of soft hadrons in the opposite direction of the jets as an unambiguous signal of the diffusion wake. Using a two-Gaussian fit, we extract the diffusion wake and MPI contributions to the double peak. The diffusion wake valley is found to increase with the azimuthal angle away from the jet. It is also found to deepen with the jet energy loss as characterized by the $\gamma$-jet asymmetry. Its sensitivity to medium properties such as the shear viscosity and equation of state is also studied.

## Category

Theory

## Collaboration (if applicable)

**Authors:** YANG, Zhong (CCNU); Dr WANG, Xin-Nian (Lawrence Berkeley National Lab. (US))

**Presenter:** YANG, Zhong (CCNU)

**Session Classification:** Poster Session

**Track Classification:** Jets