

# Girth and groomed radius of jets recoiling against isolated photons in lead-lead and proton-proton collisions at $\sqrt{s_{\text{NN}}} = 5.02 \sim \text{TeV}$

Thursday, 1 August 2024 10:00 (20 minutes)

This talk presents the first measurements of the groomed jet radius  $R_g$  and the jet girth  $g$  in events with an isolated photon recoiling against a jet in lead-lead (PbPb) and proton-proton (pp) collisions at the LHC at a nucleon-nucleon center-of-mass energy of 5.02 TeV. The observables  $R_g$  and  $g$  provide a quantitative measure of how narrow or broad a jet is. The analysis uses PbPb and pp data samples with integrated luminosities of  $1.7 \sim \text{nb}^{-1}$  and  $301 \sim \text{pb}^{-1}$ , respectively, collected with the CMS experiment in 2018 and 2017. Events are required to have a photon with transverse momentum  $p_T^\gamma > 100 \sim \text{GeV}$  and at least one jet back-to-back in azimuth with respect to the photon and with transverse momentum  $p_T^{\text{jet}}$  such that  $p_T^{\text{jet}}/p_T^\gamma > 0.4$ . The measured  $R_g$  and  $g$  distributions are unfolded to the particle level, which facilitates the comparison between the PbPb and pp results and with theoretical predictions. It is found that jets with  $p_T^{\text{jet}}/p_T^\gamma > 0.8$ , i.e. those that closely balance the photon  $p_T^\gamma$ , are narrower in PbPb than in pp collisions. Relaxing the selection to include jets with  $p_T^{\text{jet}}/p_T^\gamma > 0.4$  reduces the narrowing of the angular structure of jets in PbPb relative to the pp reference. This shows that selection bias effects associated with jet energy loss play an important role in the interpretation of jet substructure measurements.

**Primary authors:** HARIKRISHNAN, Bharadwaj (LLR); LIAO, hongbo

**Presenter:** HARIKRISHNAN, Bharadwaj (LLR)

**Session Classification:** Heavy Ions

**Track Classification:** Heavy Ions