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Thermal photon v_3 at LHC from event-by-event hydrodynamics

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Thermal photon v_3 is calculated for 0–40% central collisions of Pb nuclei at LHC from event-by-event ideal hydrodynamic model [1]. The differential triangular flow parameter $v_3(p_T)$ calculated with respect to the participant plane (PP) is found to be non-zero, positive, and shows similar qualitative nature to the elliptic flow parameter $v_2(p_T)$ [2]. At $p_T = 1$ GeV v_3(PP) is found to be about half of v_2(PP) however, for larger values of p_T these two anisotropy parameters become comparable. The global geometry of the produced matter as well as the local fluctuations in the initial density distribution are responsible for this substantial value of the triangular flow parameter for thermal photons where v_3(PP) probes the initial state geometry in an indirect way via the generation of additional transverse flow. v_3 calculated with respect to the reaction plane as expected is close to zero. v_3(PP) strongly depends on the value of the fluctuation size parameter σ especially in the higher p_T region where, a larger σ results in a smaller v_3(PP). In addition, the v_3(PP) is found to increase with the initial formation time of the system.

[1] R. Chatterjee, D. K. Srivastava, and T. Renk, arXiv:1401.7464.

[2] R. Chatterjee, H. Holopainen, I. Helenius, T. Renk, and K. J. Eskola, PRC88, 034901 (2013).

On behalf of collaboration:

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