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Influence of background subtraction on jet reconstruction in heavy-ion collisions

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In order to get information about the characteristics of the medium produced in high-energy heavy-ion collisions using reconstructed jets, the effect of background subtraction has to be well under control. In this study, we address this issue by embedding jets in a heavy-ion event and then considering the influence of the subtraction method and of different backgrounds, characterized by different mean values and fluctuations, on the momentum imbalance and azimuthal distributions of the two leading jets in each event. Two different background modelings - a detailed Monte Carlo and a flexible toy model, and two subtraction methods - an area-based one similar to that used by ALICE and ATLAS, and a pedestal subtraction technique using the information in calorimetric cells resembling the one employed by CMS, are examined. We also consider the effect of quenching using the Q-PYTHIA Monte Carlo, and some additional background characteristics like elliptic flow. Our aim is to understand the possible differences between the results using the two reconstruction techniques, and how they react to the mentioned modifications of the signal and background.

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