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Quantum coherence measurements using two-, three-, and four-pion Bose-Einstein correlations

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“Coherence of pions in the final state is known to suppress Bose-Einstein correlations. The amount of suppression increases for higher order correlations. We present a new method to measure the coherent fraction of pions using multi-pion Bose-Einstein correlations. The comparison of two-, three-, and four-pion correlations allows for a more unambiguous measure of the coherent fraction. We present the measurements in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV with ALICE at the LHC. We also show how the methodology can be extended for future measurements in smaller systems such as pp and p-Pb.”

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