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2-D mode expansion of the transverse phase space

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Traditionally, the phase space of produced particles in relativistic heavy ion collisions has been studied in terms of Fourier basis that decompose the azimuthal distribution giving rise to the well known flow coefficients. However, very little has been done in the radial direction to analyse the transverse momentum dependence beyond simple 'eye estimation'. We introduce a systematic 2-D decomposition to study both the radial as well as the azimuthal phase space dependency in terms of Fourier-Bessel basis. This introduces a class of observables that enable us to extract novel information of the phase space distribution which form the basic building blocks using which all other observables may be constructed systematically. We will take up a few applications of this novel Fourier-Bessel decomposition to illustrate its utility.

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