

Electromagnetic effects on meson production - a "new femtoscopy"?

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Collaboration

Abstract content

We review our studies of spectator-induced electromagnetic (EM) effects on charged meson emission in ultrarelativistic heavy ion collisions. These effects are found to consist in the electromagnetic *charge splitting* of pion directed flow as well as very large distortions in spectra and ratios of produced charged mesons (like π^+/π^- , K^+/K^-).

As it emerges from our analysis, such EM effects offer sensitivity to the actual distance d_E between the pion formation zone at freeze-out and the spectator matter. As a result, this gives a new possibility of studying the space-time evolution of dense and hot matter created in the course of the collision. Having established that d_E traces the longitudinal evolution of the system and therefore rapidly decreases as a function of pion rapidity, we investigate the latter finding in view of pion feed-over from intermediate resonance production. As a result we obtain a *first estimate of the pion decoupling time from EM effects*. This we compare to existing HBT data.

We conclude that spectator-induced EM interactions can serve as a new tool for studying the space-time characteristics and longitudinal evolution of the system. This “new femtoscopy” remains completely autonomous and independent from HBT information. We discuss the future perspectives for this activity on the basis of existing and future data from NICA, NA61/SHINE, STAR and ALICE.

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