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Fire-streaks, electromagnetic effects, directed flow and lifetime of the plasma at SPS energies

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We present our calculation [1] of electromagnetic effects, induced by the spectator charge on Feynman-x_F distributions of charged pions in peripheral $Pb+Pb$ collisions at CERN SPS energies, including realistic initial space-time-momentum conditions for pion emission. The calculation is performed in the framework of the fire-streak model, adopted to the production of both π^- and π^+ mesons. Isospin effects are included to take into account the asymmetry in production of π^+ and π^- at high rapidity. A comparison to a simplified model from the literature is made. We obtain a good description of the NA49 data on the x_F- and p_T-dependence of the ratio of cross sections π^+/π^-. The experimental data favors short times ($0.5 < \tau < 2$ fm/c) for fast pion creation in the local fire-streak rest frame. The possibility of the expansion of the spectators is considered in our calculation, and its influence on the electromagnetic effect observed for the π^+/π^- ratio is discussed. We conclude that the fire-streak model, which properly describes the centrality dependence of π^- rapidity spectra at CERN SPS energies, also provides realistic initial conditions for pion production. Consequently, it provides a quantitative description of the electromagnetic effect on the
π^+/π^- ratio as a function of x_F.

We shall discuss also charge splitting of the directed flow of pions for RHIC beam energy scan data in the same phenomenological approach [2].

[1] V. Ozvenchuk, A. Rybicki, A.Szczurek, A. Marcinek, M. Kielbowicz,
arXiv:1910.04544.

[2] V. Ozvenchuk et al, a paper in preparation.

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Secondary track (number)

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