XXIV QUARK MATTER DARMSTADT 2014

Contribution ID: **107** Type: **Poster**

# The onset of pion condensation in heavy-ion collisions at the LHC energies

*Tuesday 20 May 2014 16:30 (2 hours)*

Statistical models of hadron production have become one of the cornerstones of our understanding of ultra-relativistic heavy-ion collisions [1]. However, the measured proton abundances in Pb+Pb collisions at sqrt(sNN) = 2.76 TeV at LHC do not agree with the most common versions of the thermal models. Besides the proton anomaly, the same LHC data exhibits the low-transverse-momentum enhancement of pion spectra by about 25-50% with respect to the predictions of various thermal and hydrodynamic models [2].

In the recent work [3] we connect the proton anomaly with the pion enhancement effect and show that the two problems may be solved naturally within the statistical model which assumes chemical non-equilibrium at the freeze-out and a special combination of freeze-out geometry and flow - the Krakow single-freeze-out model in the Monte-Carlo version implemented in THERMINATOR [4].

We find a remarkable agreement between our model and the measured transverse-momentum spectra of pions and kaons. Although the protons are not included in the fit, our model explains well their spectrum, in addition to their yield. We also find a satisfactory description of hyperons with the same parameters.

Correct description of the low-transverse-momentum enhancement of pions within our model suggests that it may be interpreted as a signature of the onset of pion condensation in ultra-relativistic heavy-ion collisions at the LHC energies. This is so, since the freeze-out conditions in the model are very close to the pion condensation point.

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**Session Classification:** Poster session

**Track Classification:** Thermodynamics and Hadron Chemistry