Contribution ID: **23**　　　　Type: **20 min.**

Manifestation of nuclear effects in fractal analysis of Monte Carlo AMPT events using SePaC method

Thursday 18 September 2025 09:30 (20 minutes)

Manifestation of nuclear effects in fractal analysis of Monte Carlo AMPT events using SePaC method

T.G. Dedovich[1,2] and M.V. Tokarev[1,2]
[1] *Joint Institute for Nuclear Research, Dubna, Russia*
[2] *Dubna State University, Dubna, Russia*
E-mail: tdedovich@jinr.ru

Search for extreme directions associated with changes in the state of matter is one of the tasks of modern high-energy physics. It is known that systems exhibit fractal behavior near phase transitions. Fractality (intermittency) of identified charged hadrons in the range of pseudorapidities $|\eta|< 0.5$ and transverse momentum $0.2 < pT < 2.0$ GeV/c is studied in the STAR experiment at RHIC in AuAu interactions at energies $\sqrt{sNN}$ = 7.7–200 GeV [1]. In the present work, the manifestations of nuclear effects on the results of fractal analysis of Monte Carlo (MC) AuAu events are studied. Events at the AuAu energy of $\sqrt{sNN}$ = 200 GeV were obtained using A Multi-Phase Transport (AMPT) generator [2, 3]. Events of several centrality classes 0-5%, 5-10%, 10-20% and 30-40% were considered. Event-by-event fractal analysis carried out using the SePaC [4-7] method allows us to divide events into fractal and non-fractal ones. It was found that the selected fractal events have a complex pt-spectrum, and the spectrum of non-fractal events is approximated by an exponential in the region of average pt values. Nuclear effects such as final state interactions (FSI), nuclear shadowing, production of high transverse momentum minijets and quark-antiquark pairs are discussed in terms of their manifestation in the event-by-event fractal analysis. It is shown that final state interactions significantly increases the proportion of non-fractal events with exponential pt-spectrum. The absence of FSI and nuclear shadowing leads to dependence of the pt-spectrum slope on centrality. Production of high transverse momentum minijets and quark-antiquark pairs affects the shape of pt-spectra of fractal events.

1. M.I. Abdulhamid et al., Physics Letters B 845 (2023) 138165
2. Z.W. Lin, C.M. Ko, Phys. Rev. C 65, 034904 (2002).
3. Z.W. Lin et al., Phys. Rev. C 72, 064901 (2005).
4. T.G. Dedovich, M.V. Tokarev, Phys. Part. Nucl. Lett. 9, 552 (2012).
5. T.G. Dedovich, M.V. Tokarev, Phys. Part. Nucl. Lett. 10, 481 (2013).
6. T.G. Dedovich, M.V. Tokarev, Phys. Part. Nucl. Lett. 10, 491 (2013).
7. T.G. Dedovich, M.V. Tokarev, Phys. Part. Nucl. Lett. 18, 93 (2021).

Author: DEDOVICH, Tatiana (JINR)

Co-author: TOKAREV, Mikhail (Joint Institute for Nuclear Research)

Presenter: DEDOVICH, Tatiana (JINR)

Session Classification: Cumulative and subthreshold processes

Track Classification: Relativistic heavy ion collisions