Contribution ID: **682** Type: **Poster**

Transport of hard probes through glasma

Wednesday, 6 April 2022 18:42 (4 minutes)

Hard probes, due to their large momenta (or masses), are produced only through hard interactions with large momentum transfer at the earliest phase of a heavy-ion collision. They then propagate through the evolving medium probing QCD matter at different energy scales and different phases of the fireball evolution. During this propagation heavy quarks and high-p_T partons lose a substantial fraction of their initial energy. While machanisms of the energy losses are quite well understood in equilibrated QGP, the influence of pre-equilibrium phases on transport of hard probes has been only fragmentarily explored.

In the talk, I will demonstrate that the glasma can indeed play an important role in transport of hard probes. I will discuss the transverse momentum broadening coefficient $\hat{q}$ and collisional energy loss dE/dx of hard probes moving through the glasma. First, I will present the methodology that is used to compute the transport coefficients: the Fokker-Planck equation, whose collision terms determine $\hat{q}$ and dE/dx, and the proper time expansion that describes the temporal evolution of the glasma. The correlators of chromodynamic fields that determine the Fokker-Planck collision terms are computed to fifth order. The transport coefficients are shown to be strongly dependent on time and orientation of the probe's velocity. They are large, $\hat{q}$ is of the order of a few $\mathrm{GeV}^2/\mathrm{fm}$ and $dE/dx \sim 1~\mathrm{GeV}/\mathrm{fm}$, in the domain of validity of the proper time expansion and their values depend on the probe's velocity **v** and the parameters: coupling constant g, saturation momentum Q_s (UV scale), and IR regulator m, fixed by the confinement scale. I will show how $\hat{q}$ depends on all these quantities. Different regularization procedures will be also analysed and shown to lead to similar results for $\hat{q}$. Finally, I will discuss limitations of the whole our approach, such as the validity of the proper-time expansion and constraints resulting from the Fokker-Planck equation.

Primary authors: CZAJKA, Alina (National Centre for Nuclear Research); CARRINGTON, Margaret; MRÓWCZYŃSKI, Stanisław (Jan Kochanowski University)

Presenter: CZAJKA, Alina (National Centre for Nuclear Research)

Session Classification: Poster Session 2 T04_1

Track Classification: Jets, high-pT hadrons, and medium response