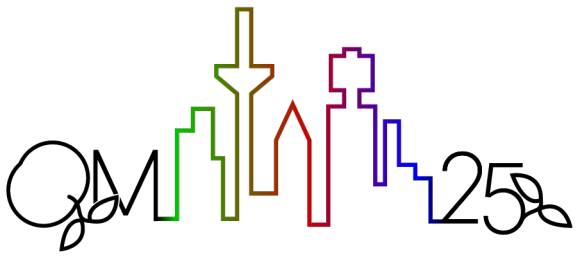

Contribution ID: **621** Type: **Oral**

Determination of space diffusion coefficient by heavy flavour R_{AA} and v_n in an event-by-event approach

Wednesday 9 April 2025 09:00 (20 minutes)

The strong interaction in the non-perturbative regime typical of the system created in Heavy-Ion collision has been studied in the past years through an effective Quasi-Particle Model (QPM): we present an extension to a more realistic model, named $QPMp$, incorporating momentum-dependent parton masses as entailed by QCD asymptotic free dynamics. This model naturally improves the description of quark susceptibilities previously underestimated in the simple QPM. Coupling the $QPMp$ modeling to an event-by-event transport approach based on Langevin equations, we evaluate the heavy-flavour $R_{AA}(p_T)$ and $v_n(p_T)$ for D, Λ_c, B, Λ_b hadrons in $PbPb$ as well as for OO at 5 $ATeV$. In $PbPb$ we find a quite good prediction for both D meson and leptons from B decays at least within current experimental uncertainties; we also discuss the additional information that can be carried by collisions of light OO system.
A main general result is that for charm quark the extracted space diffusion Ds(T) appears to be significantly larger (about $30-40\%$) wrt the recent lQCD/NREFT results at momentum $p = 0$. We propose a novel analysis that point out the crucial role of the momentum dependence of the interaction to draw solid conclusions about the agreement between the phenomenological approach and lQCD calculation as well as to determine the thermalization time of HQ and in particular its mass dependence from charm to bottom quark. We will point out that Λ_c production and the $R_{AA}(p_T)$ of D meson at very low momenta ($p_T < 1.5\ GeV$) will allow for a novel and more solid determination of the space diffusion coefficient.

M.L.Sambataro, V. Minissale, S. Plumari and V. Greco, Phys.Lett.B 849 (2024) 138480.

M. L. Sambataro, V. Greco, G. Parisi and S. Plumari, Eur.Phys.J.C 84 (2024) 9, 881.

M.L.Sambataro et al., in preparation.

Category

Theory

Collaboration (if applicable)

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