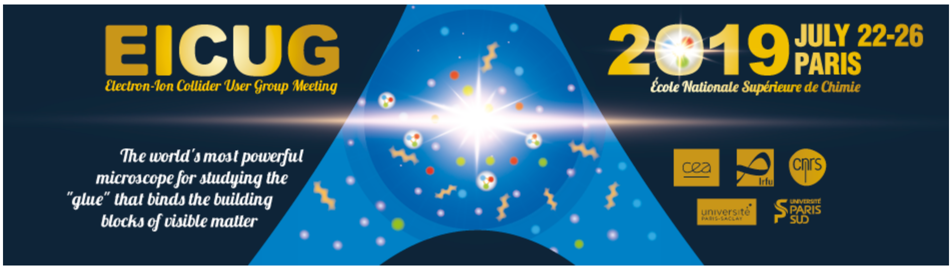

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Topological charge fluctuations in the Glasma

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The early-time evolution of the system generated in ultra-relativistic heavy ion collisions is dominated by the presence of strong color fields known as Glasma fields. These can be described following the classical approach embodied in the Color Glass Condensate effective theory, which approximates QCD in the high gluon density regime. In this framework we perform an analytical first-principles calculation of the two-point correlator of the divergence of the Chern-Simons current at proper time $\tau = 0^+$, which characterizes the early fluctuations of axial charge density in the plane transverse to the collision axis. This object plays a crucial role in the description of anomalous transport phenomena such as the Chiral Magnetic Effect. We compare our results to those obtained under the Glasma Graph approximation, which assumes gluon field correlators to obey Gaussian statistics. While this approach proves to be equivalent to the exact calculation in the limit of short transverse separations, important differences arise at larger distances, where our expression displays a remarkably slower fall-off than the Glasma Graph result ($1/r^4$ vs.\ $1/r^8$ power-law decay). This discrepancy emerges from the non-linear dynamics mapping the Gaussianly-distributed color source densities onto the Glasma fields, encoded in the classical Yang-Mills equations. Our results support the conclusions reached in a previous work, where we found indications that the color screening of correlations in the transverse plane occurs at relatively large distances.

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