

MACH CONES IN A PERTURBATIVE QUARK-GLUON PLASMA

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We derive and evaluate the local distribution of energy and momentum deposited by a fast parton in a quark-gluon plasma in the framework of hard-thermal loop perturbation theory. We then use our result as a source term for the formation of sound waves in the plasma. We show that a Mach cone develops behind the parton in linearized dissipative hydrodynamics [1], if the parton moves faster than the speed of sound in the plasma. Finally, we explore the effects of the source term in a realistic nuclear collision within a numerical solution of three-dimensional ideal relativistic hydrodynamics [2].

References

- [1] J. Casalderrey-Solana, E. V. Shuryak and D. Teaney, arXiv:hep-ph/0602183.
- [2] C. Nonaka and S. A. Bass, Phys. Rev. C **75**, 014902 (2007)