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Universal quark/gluon ratio & turbulent nature of jet quenching

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We investigate the radiative break-up highly energetic quark and gluon jets due to medium-induced Bremsstrahlung in a high-temperature plasma. We find that within an inertial
range of momenta T « p « E, where E denotes the energy of the jet and T the temperature of of the medium, the quark/gluon ratio of fragments is identical for quark and gluon jets and approximately given by the ratio of moments of the in-medium splitting functions for the q -> qg and g -> qq processes. We demonstrate how this behavior can be understood analytically by considering the turbulent nature of the radiative break-up process and discuss prospects for experimental measurements and implications for early time dynamics of heavy-ion collisions.

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