E

Abstract Submitted
for the DNP04 Meeting of
The American Physical Society

Sorting Category: 13d.

Energy Loss of hard scattered partons in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV determined from measurements of π^0 and charged hadrons in PHENIX M.J. TANNENBAUM, Brookhaven National Laboratory, Upton, NY 11973-5000 — One of the most exciting discoveries at RHIC was the observation of suppression of high p_T π^0 and charged hadrons in Au+Au collisions. This is conventionally measured by the ratio of the semi-inclusive yield as a function of centrality in Au+Au collisions to the $\langle T_{AB}\rangle$ scaled reference p_T spectrum from p-p collisions.

$$R_{AA}(p_T) = \frac{(1/N_{AA}^{evt})d^2N_{AA}(p_T)/p_T dp_T dy}{\langle T_{AA}\rangle \times d^2\sigma_{pp}(p_T)/p_T dp_T dy} \quad . \tag{1}$$

Owing to the pure power-law of the reference spectrum for $p_T > 3$ GeV/c, $Ed^3\sigma/dp^3 \propto p_T^{-n}$, with $n = 8.1 \pm 0.1$, the p_T spectrum of jet fragments follows the same power as the parton spectrum in the x_T range measured, and the suppression—which is attributed to energy loss of the partons in dense nuclear matter—can be equally well represented as a shift in the reference p_T spectrum instead of a ratio:

$$(1/N_{AA}^{evt})d^2N_{AA}(p_T)/dp_T dy = \langle T_{AA}\rangle \times d^2\sigma_{pp}(p_T + S(p_T))/dp_T dy \tag{2}$$

$$S(p_T)/p_T = R_{AA}(p_T)^{-1/(n-1)} - 1 \quad . \tag{3}$$

From the observed constancy of R_{AA} vs. centrality for $p_T > 4.5$ GeV/c, the fractional energy loss is determined to be constant in this range and is shown as a function of the $dn_{ch}/d\eta$ and Bjorken Energy density corresponding to the centrality in hopes of finding a simple relationship.

☒ Prefer Oral Session
☐ Prefer Poster Session

M. J. Tannenbaum
mjt@bnl.gov
Brookhaven National Laboratory, Upton, NY 11973-5000

Special instructions: This talk is first in a sequence Tannenbaum, Mioduszewski, Cole

Date submitted: June 30, 2004

Electronic form version 1.4