**Abstract**

Fragmentation functions measured in $e^+e^-$ and pp collisions are well reproduced via a fragmentation model based on microcanonical statistics and superimposed Euler-Gamma-type multiplicity fluctuations [1,2]. The power of the obtained analytic fragmentation function develops a double-logarithmic dependence on the QCD scale $Q$ [3]. 

Besides, this function also describes transverse hadron spectra measured in pp and AA collisions at RHIC and LHC energies [4,5,6]. Interestingly, the power of the spectra of pions stemming from gg collisions exhibits a similar double-logarithmic dependence on the collision energy $s$ and on the hadron multiplicity $N$ (measured in the $|p_T|<1$ region) [6].

**Statistical Jet Fragmentation?**

Hadron distribution in a microcanonical jet of $N$ hadrons (in 1 dimension) [1,2):

\[
\frac{dN}{dp} = \frac{1}{N!} e^{-\frac{p^2}{2}}
\]

Multiplicity fluctuations in jets:

\[
\Delta p = |p - p_{\text{mean}}|
\]

The multiplicity-averaged distribution:

\[
\frac{d\langle N \rangle}{dp} = \frac{1}{N!} e^{-\frac{p^2}{2}}
\]

Dependence of the fitted parameters on $P_p$:

\[
g(z) = \frac{1}{\ln x - \ln \left(\frac{1}{s}\right)}
\]

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**Tranverse Spectra in pp**

Hadron spectra in pp collisions can be described by the Tsallis distribution [5,6]:

\[
\frac{dN}{dp} = \frac{1}{\sqrt{\left(1 + Q + \frac{Q}{1 - |p|} - 1\right)}}
\]

Interestingly, transverse $p_T$ spectra in pp collisions depends similarly on $|p_T|$ and on the multiplicity $N$ in $|p_T|<1$ range [6].

\[
\frac{dN}{dp} = \frac{1}{\sqrt{\left(1 + Q + \frac{Q}{1 - |p|} - 1\right)}}
\]

**Application in parton model calculation**

At low energies, $z < 1$, the above formula approaches the Tsallis distribution [3].

\[
\frac{dN}{dp} = \frac{1}{\sqrt{\left(1 + Q + \frac{Q}{1 - |p|} - 1\right)}}
\]

AKK $u$, $d$, $s$, $g$ fragmentation functions can be fitted by the Tsallis-type one using [3]:

\[
\frac{dN}{dp} = \frac{1}{\sqrt{\left(1 + Q + \frac{Q}{1 - |p|} - 1\right)}}
\]

**Disentangling Soft & Hard Yields in Heavy-ion Collisions**

See preliminary on arXiv!

**References**


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