

1 **MULTI-DIMENSIONAL MEASUREMENTS OF PARTON**
2 **SHOWER IN PP COLLISIONS AT RHIC**
3 **ABSTRACT FOR ICHEP 22**

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7 Jets are collimated sprays of hadrons and serve as an experimental tool for study-
8 ing the dynamics of quarks and gluons. In particular, differential measurements of
9 jet substructure enable a systematic exploration of the parton shower evolution.
10 The SoftDrop grooming technique utilizes the angular ordered Cambridge/Aachen
11 reclustering tree and provides a correspondence between the experimental observ-
12 ables, such as the shared momentum fraction (z_g), groomed jet radius or split
13 opening angle (R_g), and the QCD splitting functions in vacuum. We present fully
14 corrected correlations between z_g and R_g at the first split for jets of varying mo-
15 menta and radii in pp collisions at $\sqrt{s} = 200$ GeV. To study the evolution along
16 the jet shower, we also present the splitting observables at the first, second and
17 third splits along the jet shower for various jet and initiator prong momenta. As
18 these novel measurements are presented in three dimensions, we outline the cor-
19 rection procedure so that it can be used as a template for future multi-differential
20 measurements across all experiments.

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