

Safely Eating Junk: Pileup and Infrared Radiation Annihilation

Monday 2 August 2021 17:20 (15 minutes)

Jet grooming is an important tool for the analysis of relativistic particle collisions despite the presence of contaminating radiation. Modern jet grooming techniques, such as Soft Drop grooming, introduce sharp cutoffs to remove soft radiation. These sharp cutoffs can lead to discontinuous behavior and associated experimental and theoretical challenges. In this talk, I introduce a new class of grooming procedures, Pileup and Infrared Radiation Annihilation (PIRANHA), motivated by ideas from optimal transport theory. I explore the behavior of the PIRANHA class of grooming procedures, both analytically and in Pythia 8, and detail the extent to which PIRANHA grooming procedures are more continuous than other grooming methods. I demonstrate that the PIRANHA strategy can overcome some of the challenges of previous grooming procedures, and explore its robustness to non-perturbative physics, detector effects, and the underlying event.

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Session Classification: ML : Pileup Mitigation + Jet Tagging