

# status

- ▶ a test version of GeorgiClustering has been implemented, with #mini-jet = 20. (kekcc:~tianjp / analysis / PostDBD / GeorgiClustering)
- ▶ number of combinations =  $2^{10} \sim 1\text{M}$ , CPU time  $\sim 0.3\text{s}$  / event.
- ▶ several bugs in SatoruJetFinder have been found and fixed when we need more than 20 mini-jets. (kekcc:~tianjp / soft / MarlinReco / v01-10)
- ▶ surprisingly found that FastJetClustering(Processor) in current ilcsoft only supports kt type clustering; need a few efforts to support Durham (some one interested welcome to go ahead).

## Jet function:

$$J_{\beta}(P_{\alpha}) \equiv E_{\alpha} - \beta \frac{P_{\alpha}^2}{E_{\alpha}} = E_{\alpha} [(1 - \beta) + \beta v_{\alpha}^2] ,$$



# a first look at new GeorgiClustering

original

$$J_{\beta}(P_{\alpha}) \equiv E_{\alpha} - \beta \frac{P_{\alpha}^2}{E_{\alpha}} = E_{\alpha} [(1 - \beta) + \beta v_{\alpha}^2]$$

generalized

$$J_{\beta}^{(n)}(P_{\alpha}) \equiv E_{\alpha}^n [(1 - \beta) + \beta v_{\alpha}^2]$$

- ▶ a practical issue is to decide value of  $\beta$ , which is essentially a degree of penalty to **jet virtuality**.
- ▶ I started with constant  $\beta$  from 1 to N..., found 1 is too small, would be somewhere between 3~4, still working on that.
- ▶ I found most probably the  $\beta$  needs be tuned, to reflect different jet sub-structure.
- ▶ I'm now looking at some benchmark, purity of jet, color singlet, etc...

see following slides



# a first look at new GeorgiClustering

## ----- Jets from Georgi Clustering-----

Jet	Mass	Energy	Func	Norm	CS	E1(%)	E2(%)	E3(%)	E4(%)	Np
0	115.436	184.199	-105.172	-0.570969	1	63.0903	36.9097	0	0	34
1	7.81184	97.4018	94.8957	0.97427	1	100	0	0	0	12
2	11.0048	44.2489	33.3013	0.752589	2	0	100	0	0	21
3	0.251736	1.05797	0.81838	0.773535	2	0	100	0	0	2

## ----- Jets from Durham Clustering-----

Jet	Mass	Energy	Func	Norm	CS	E1	E2	E3	E4	Np
0	34.766	117.681	76.5981	0.650895	2	50.1823	67.4989	0	0	32
1	7.81187	97.4018	94.8957	0.97427	1	97.4018	0	0	0	12
2	3.68404	67.5756	66.7722	0.988111	1	66.0293	1.54629	0	0	4
3	11.0048	44.2489	33.3013	0.752589	2	0	44.2489	0	0	21

## ----- Jets from Georgi Clustering-----

Jet	Mass	Energy	Func	Norm	CS	E1(%)	E2(%)	E3(%)	E4(%)	Np
0	76.3245	197.817	80.0228	0.404529	2	44.2682	55.7318	0	0	79
1	20.2765	63.8971	38.1597	0.597205	2	6.0499	93.9501	0	0	38
2	7.93389	41.463	35.3904	0.853542	1	98.495	1.50504	0	0	14

## ----- Jets from Durham Clustering-----

Jet	Mass	Energy	Func	Norm	CS	E1	E2	E3	E4	Np
0	43.9904	150.39	98.9196	0.657754	2	41.2793	109.111	0	0	57
1	17.0479	61.9552	43.1912	0.697136	2	3.111	58.8442	0	0	35
2	7.8502	47.4272	42.2298	0.890411	1	46.2907	1.13651	0	0	22
3	11.2406	43.4048	31.7608	0.731735	1	41.5936	1.81118	0	0	17