

JET CLUSTERING USING NEURAL NETWORK

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STATUS

- Track assignment efficiency degrades when training events are increased
 - $\sim 80\% \rightarrow \sim 60\%$ @30events...
 - There were many bugs!!
- Reconstruct neural network architecture
 - Include convolutional neural network
 - Plus deep (feedforward) neural network
 - Cannot say detail today!
- Trying to increase training events
 - 15events $\rightarrow O(1000)$ events
 - Not yet done(due to bug fix...)

VERY PRELIMINARY RESULTS

- Using 15 $ZHH \rightarrow (qq)(bb)(bb)$ events: 6 jet assignment
- Train network with 15 events
- Check assignment efficiency using **same** events
- How many tracks can be assigned correctly

Energy ordering	jet1	jet2	jet3	jet4	jet5	jet6
NN	306	258	225	254	203	129
Durham	275	249	187	233	221	181
Total tracks	470	363	360	391	355	242

- Energy fraction of main color singlet state
 - Mean over 15 events

%	jet1	jet2	jet3	jet4	jet5	jet6
NN	82.4	87.9	81.6	79.7	74.2	71.6
Durham	72.8	68.9	67.3	80.1	72.3	73.6

- Efficiency degrades when 15 \rightarrow 30 training events...
 - Go into typically $\sim 60\%$... Less than Durham

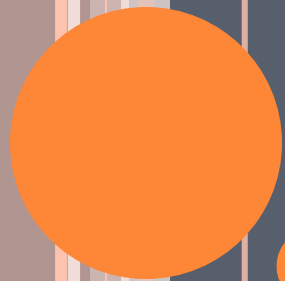
VERY PRELIMINARY RESULTS

- Using 15 $ZHH \rightarrow (qq)(bb)(bb)$ events: 6 jet assignment
- Train network with 20 events
- Check assignment efficiency using **same** events
- Fix many bugs!
- How many tracks can be assigned correctly?

Energy ordering	jet1	jet2	jet3	jet4	jet5	jet6
NN	494	426	411	390	319	296
Durham	447	410	331	278	342	270
Total tracks	586	515	563	466	388	370

- Energy fraction of main color singlet state
 - Mean over 20 events

%	jet1	jet2	jet3	jet4	jet5	jet6
NN	93.9	94.8	84.6	90.3	89.7	88.2
Durham	92.8	82.3	77.5	72.3	85.5	81.6



BACKUPS

