### Issues with Jet Reconstruction at RHIC
- jet cross section steeply falling with $p_T$ & large underlying event
- quantify these effects with HIJING study
- generate 750M minimum bias HIJING events
- tag true jets during event generation
- apply background subtraction & jet reconstruction
- quantify effects of fake jets & jet $p_T$ spectra

### Jet Background Subtraction Method
- background level determined iteratively and subtracted tower by tower
- anti-$k_t$ jet finding run on subtracted towers
- similar to ATLAS method

1. Run jet reco algorithm on 0.1x0.1 calorimeter cells
2. Determine set of seed jets
   - $R = 0.2$ Anti-$k_t$ jets
   - $E_T > 1.5$ in event, $E_T > 20$ in jets
3. Determine $v_1$ for event
   - calculate $E_T$ in $\eta$ strips
   - subtract towers within $0.4 < |\eta| < 0.8$
4. Subtract background from jets tower-by-tower
   - first remodulate background by $v_1$
5. Subtract background from event tower-by-tower
   - first remodulate background by $v_1$

Output: background subtracted reco jets of various $R$ values

### Jet Rates at RHIC
- Au+Au $(20\%)$
- $p+p$
- $d+Au$

Jet sample sizes for different collision systems per 20 week RHIC running year:

### Jet Reconstruction in Central HIJING
- true jets outnumber fake jets for
  - >20 GeV ($R = 0.2$)
  - >25 GeV ($R = 0.3$)
  - >35 GeV ($R = 0.4$)

### Jet Energy Resolution
- good jet energy measurement including effect of the underlying event (not including detector resolution)
- for $R=0.2$ jets underlying event and detector effects are comparable, for larger radius jets underlying event is dominant

### Excellent Single Jet Measurements Possible at sPHENIX
- for $20 < E_T < 60$ GeV
  - also dijets, $\gamma$-jets, jet-h...

More Details...

sPHENIX: An Upgrade Concept from the PHENIX Collaboration, arXiv:1207.6378