Gavin Salam: research interests

More theoretical topics

- High-energy limit of QCD (*BFKL* and its higher order corrections) with Ciafaloni, Colferai, Stasto
- Structures in perturbation theory with Dokshitzer, Marchesini

More phenomenological topics

- *Event shapes* and resummations: applications including gaining insight into hadronization and UE corrections at hadron colliders with Banfi, Zanderighi
- General aspects of *jet-finding*: jet definitions, implementations, phenomenological 'performance' with Cacciari, Rubin, Soyez
- *Flavour of jets*: theoretical meaning, well-defined b-jets, distinguishing quark v. gluon jets experimentally. with Banfi, Rojo, Zanderighi

Event shapes

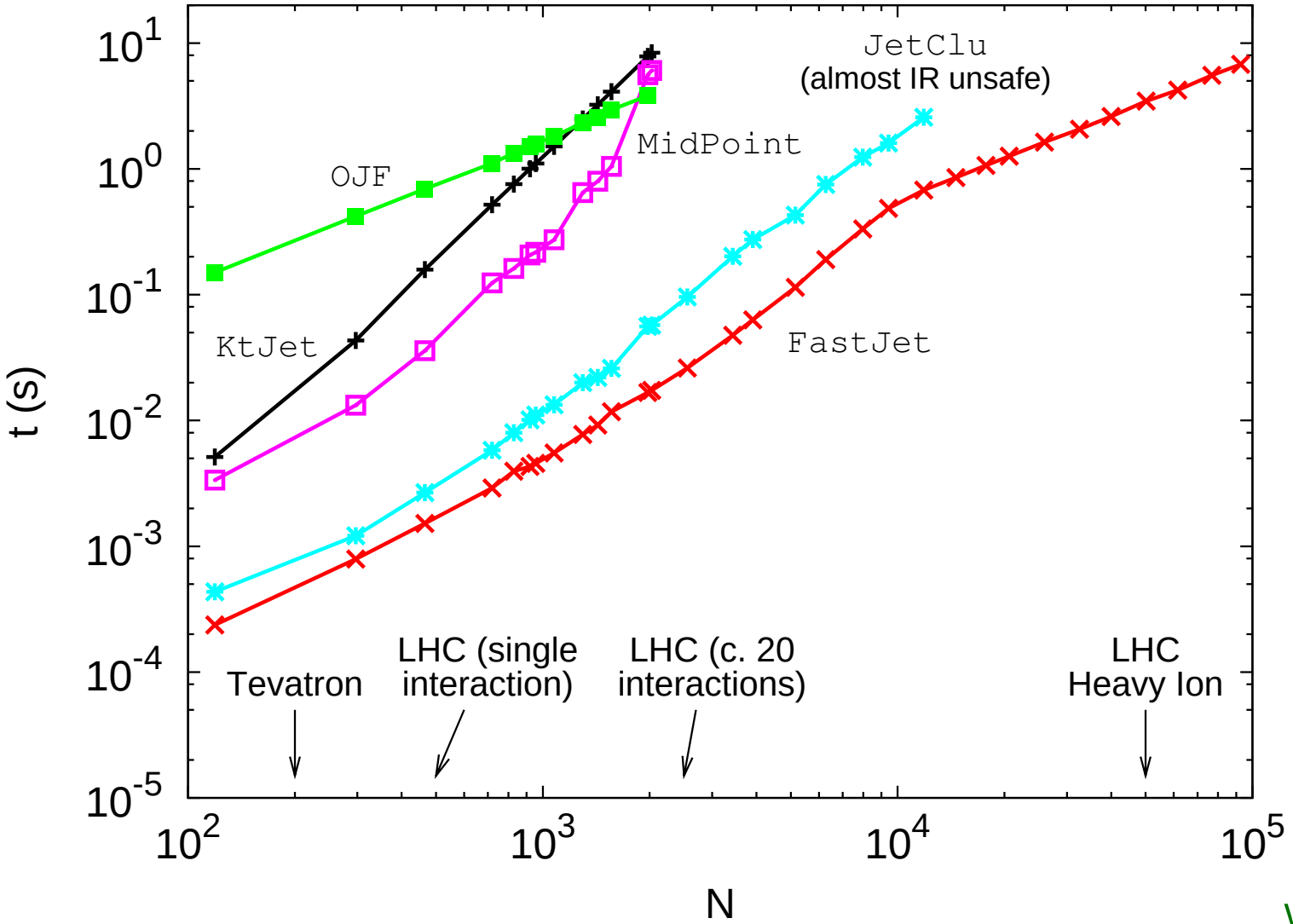
Many event shapes studied using *automated resummation* (CAESAR).

Related calculations give hints on hadronisation & UE sensitivity — much complementarity between observables, so potentially valuable input in study of hadr. and UE at *pp* colliders.

Event-shape	Impact of η_{max}	Resummation breakdown	Underlying Event	Jet hadronisation
$\tau_{\perp,g}$	tolerable	none	$\sim \eta_{\text{max}}/Q$	$\sim 1/Q$
$T_{m,g}$	tolerable	none	$\sim \eta_{\text{max}}/Q$	$\sim 1/(\sqrt{\alpha_s}Q)$
y_{23}	tolerable	none	$\sim \sqrt{y_{23}}/Q$	$\sim \sqrt{y_{23}}/Q$
$\tau_{\perp,\mathcal{E}}$, $\rho_{X,\mathcal{E}}$	negligible	none	$\sim 1/Q$	$\sim 1/Q$
$B_{X,\mathcal{E}}$	negligible	none	$\sim 1/Q$	$\sim 1/(\sqrt{\alpha_s}Q)$
$T_{m,\mathcal{E}}$	negligible	serious	$\sim 1/Q$	$\sim 1/(\sqrt{\alpha_s}Q)$
$y_{23,\mathcal{E}}$	negligible	none	$\sim 1/Q$	$\sim \sqrt{y_{23}}/Q$
$\tau_{\perp,\mathcal{R}}$, $\rho_{X,\mathcal{R}}$	none	serious	$\sim 1/Q$	$\sim 1/Q$
$T_{m,\mathcal{R}}$, $B_{X,\mathcal{R}}$	none	tolerable	$\sim 1/Q$	$\sim 1/(\sqrt{\alpha_s}Q)$
$y_{23,\mathcal{R}}$	none	intermediate	$\sim \sqrt{y_{23}}/Q$	$\sim \sqrt{y_{23}}/Q$

Jet-finding (speed)

Getting k_t and Cambridge jet finders to go fast (FastJet v. KtJet) enough for LHC:

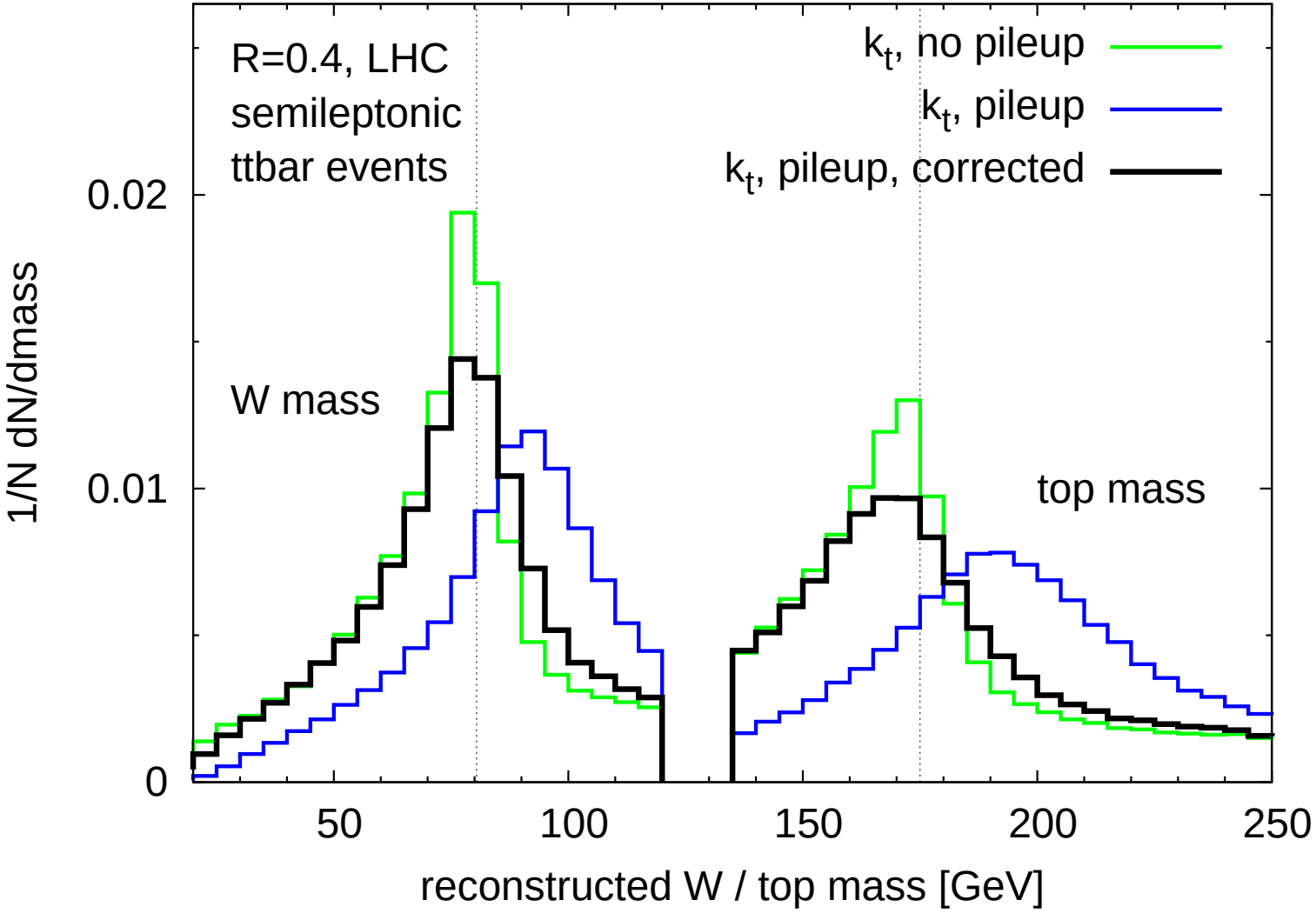


with M. Cacciari

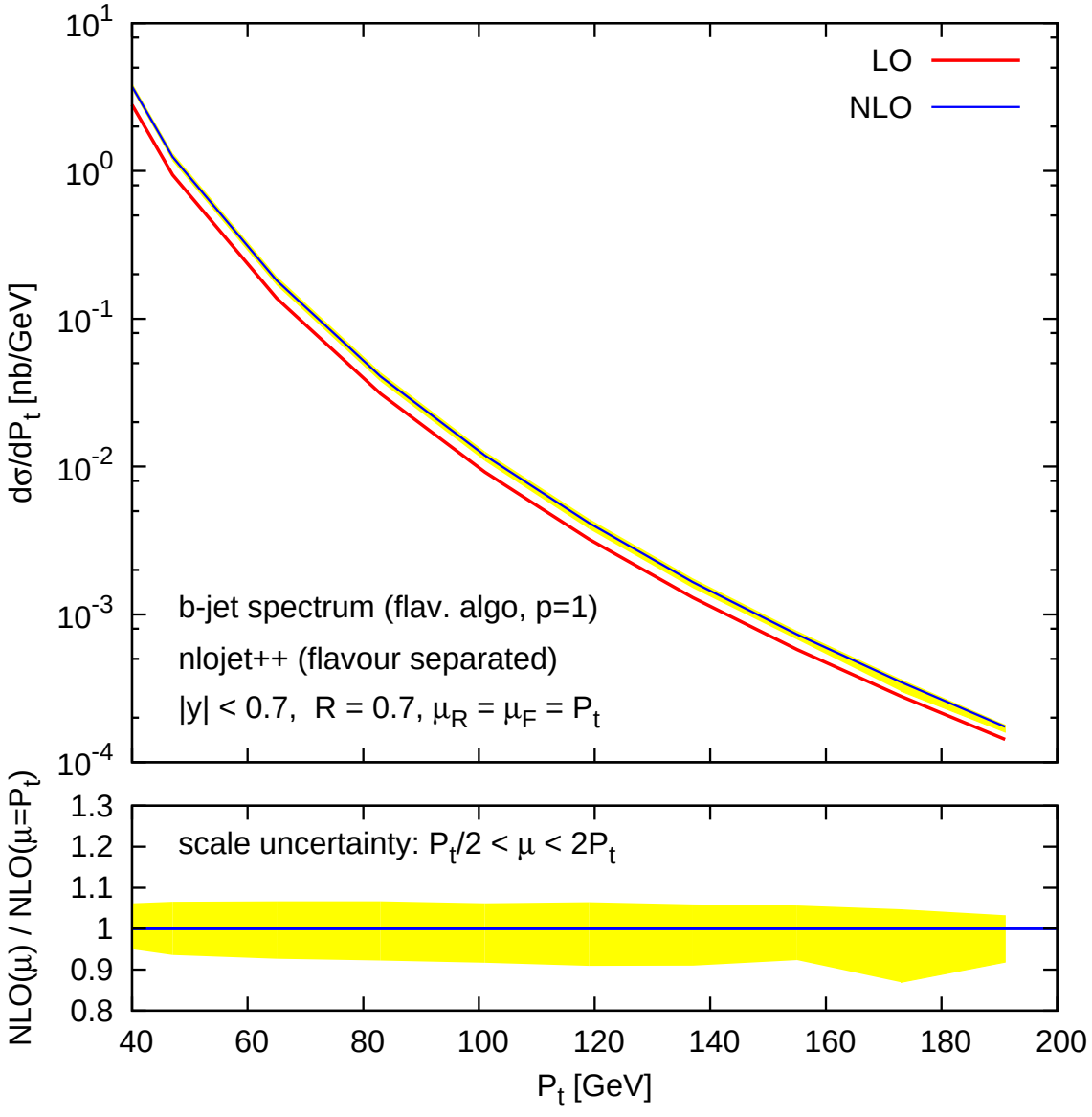
Jet-finding (correcting for pileup)

E.g. in $t\bar{t}$ at LHC:

Prelim. with M. Cacciari



b-jets



Current uncertainties on b-jet production with MCFM or MNR: $40-60\%$.

If you use the right definition ('flavour-k_t') and right tools (flavour-separated NLOJET++), reduce it to $10-20\%$.

prelim. with Banfi, Zanderighi