aExtra Update

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Introduction

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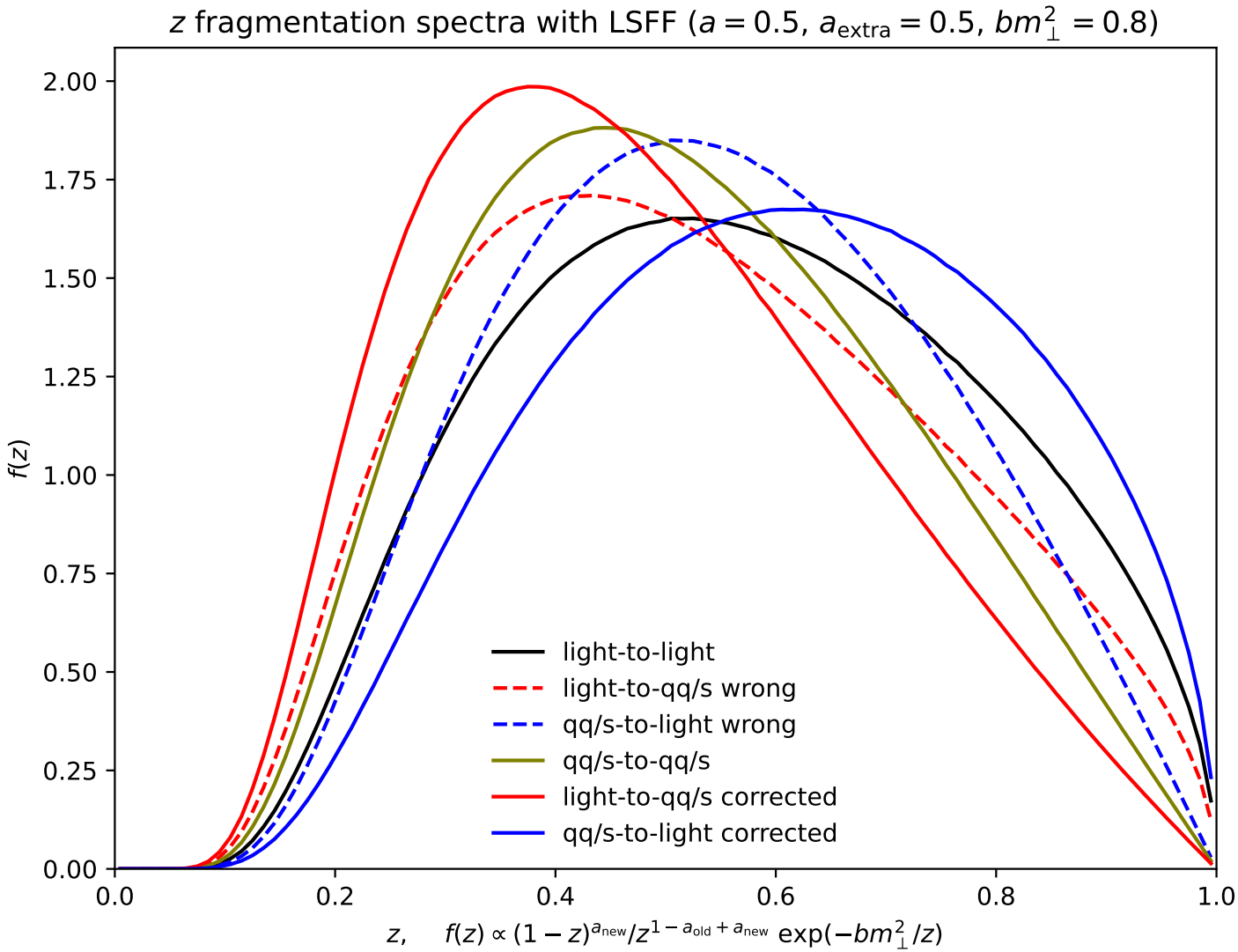
Introduction

Namely, the labels for the "old" and "new" fragmenting partons were switched. The effect on the FF is illustrated here for a typical choice of a and b.

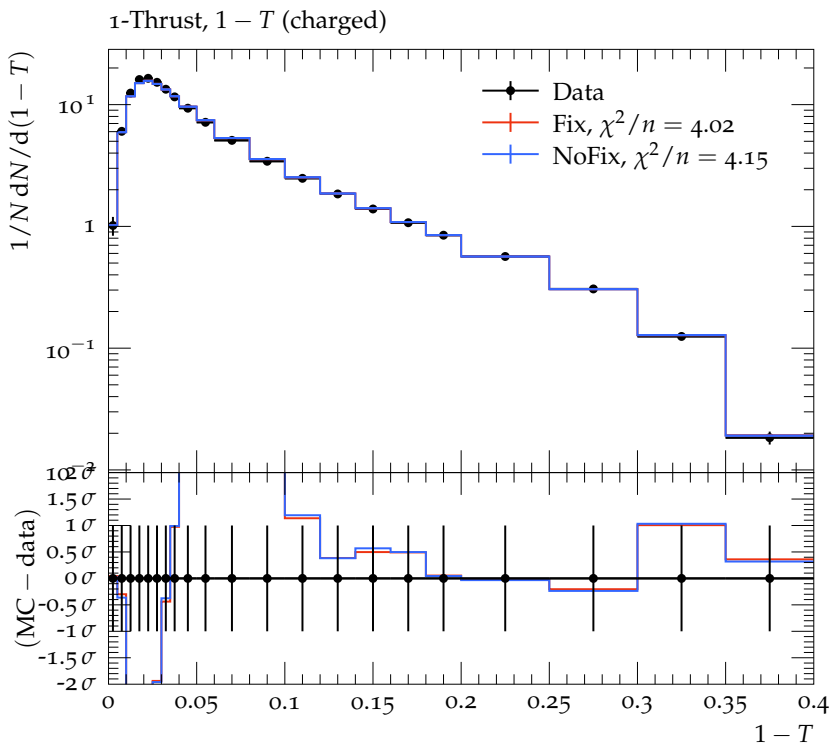


Simple Check

Basic Distributions (ALEPH omnibus `Rivet` routine).

Results encouraging.

NoFix $\equiv$ no changes. Fix $\equiv$ corrected.



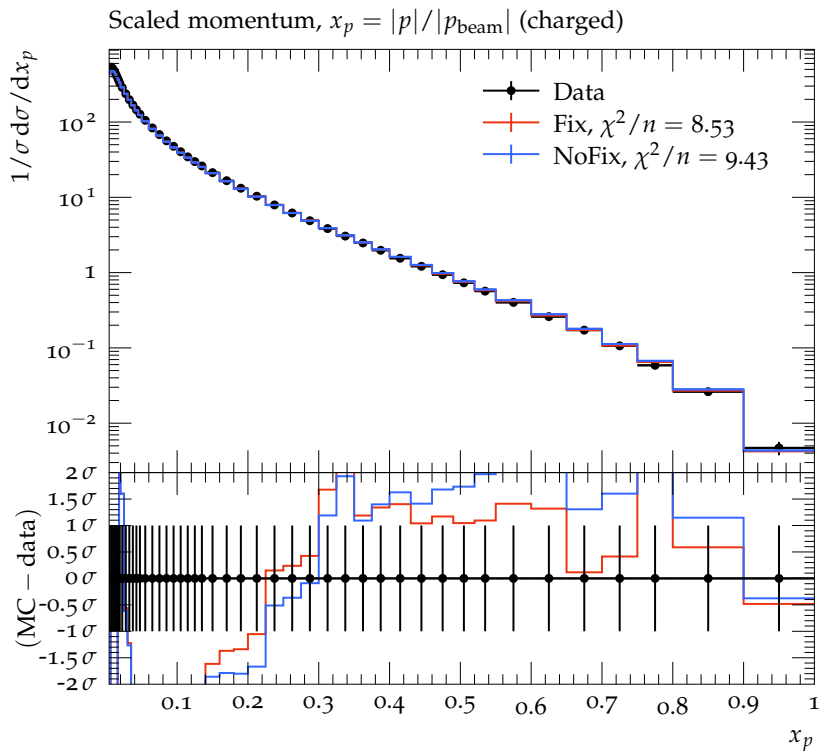


Figure: $1-T$ and x_p

Small, unexpected improvements.

Simple Check (cont)

Distributions where we expect to see a difference:

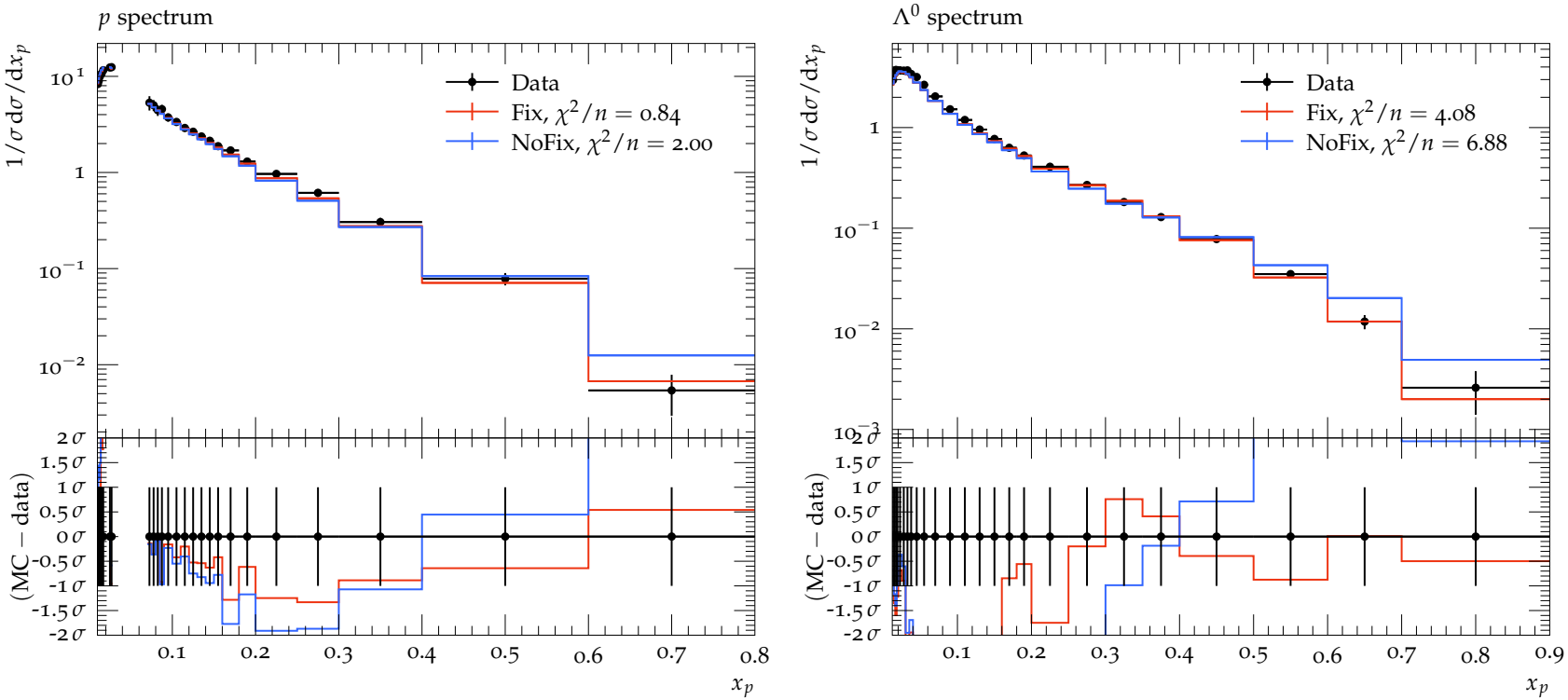


Figure: p and Λ momentum distributions

Right direction!

More Data

$\Lambda - \bar{\Lambda}$ Correlations

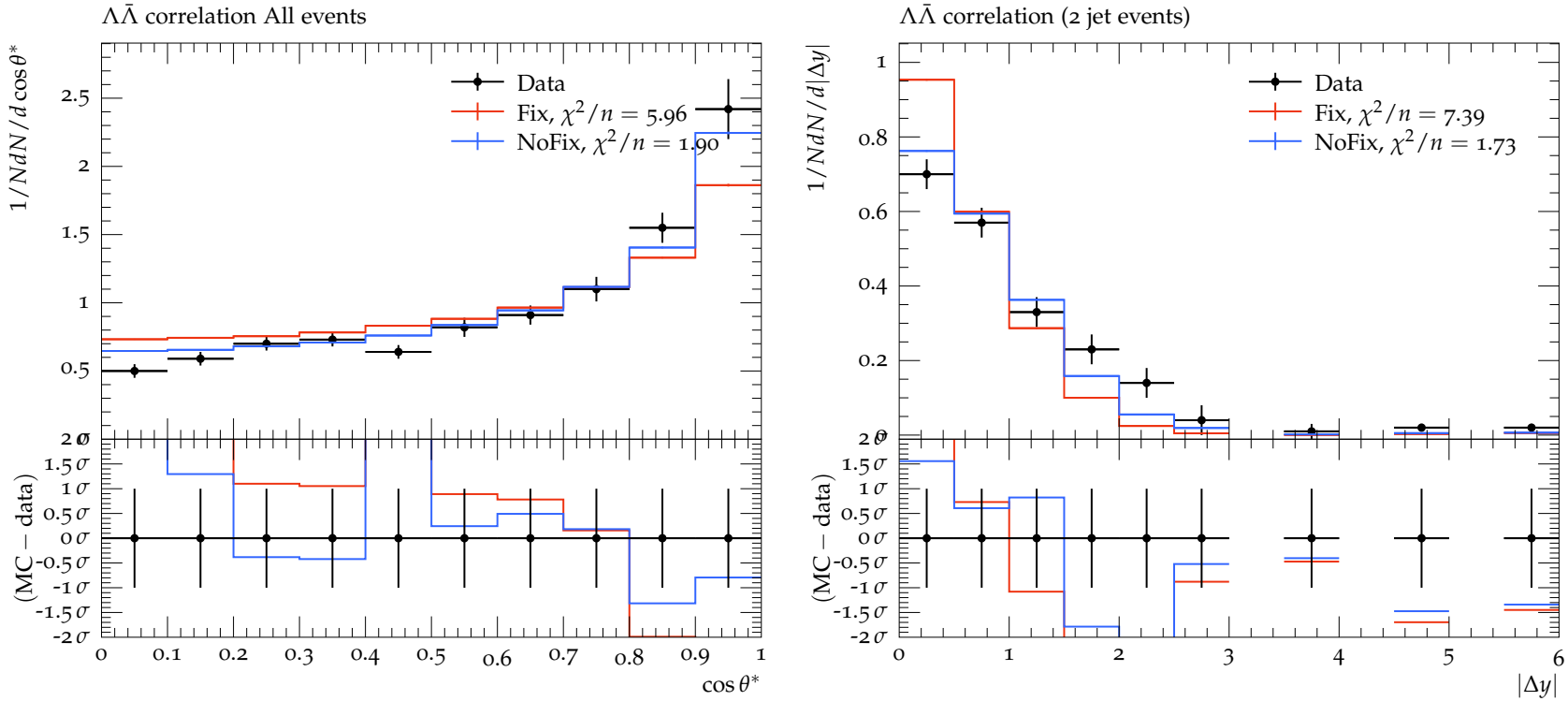


Figure: $\cos\theta^*$ and δy (2 jet events)

Caveats

- only one experiment
- original paper points to popcorn, but that didn't help (preliminary)
- do we expect to describe this?
- other physics could be involved (spin?)
- exclusive prediction fails quickly

Tuning Algorithm

After several iterations

- Pick a few Rivet analyses: add in *b*-fragmentation and Λ-correlations to ALEPH
- Pick a range of frag-sensitive parameters
- Build a surrogate function of predictions from runs with "random" parameters
- Minimize χ^2

```
PNAME                  [  PLOW        ...   PHIGH    ]
StringFlav_probQQtoQ   [ 0.0602257    ...  0.1298804 ]
StringFlav_probSQtoQQ  [ 0.5009005    ...  0.9991622 ]
StringFlav_probStoUD   [ 0.1601725    ...  0.2398629 ]
StringPT_sigma         [ 0.2008993    ...  0.4997068 ]
StringZ_aExtraDiquark  [ 0.001905537  ...  1.495745  ]
StringZ_aExtraSQuark   [ 0.003200669  ...  1.495055  ]
StringZ_aLund          [ 0.400677     ...  1.396774  ]
StringZ_avgZLund       [ 0.4000037    ...  0.5994405 ]
TimeShower_alphaSvalue [ 0.1365       ...  0.1365    ]
TimeShower_pTmin       [ 0.3503569    ...  0.6494199 ]
```

Started with small set

Expanded to try and fit Λ-correlations

Tuning Strategy

- Weight some histograms to 0 (1e-3): we know there is redundancy and correlations
  alternatively, include all, e.g. event shapes, with fixed fractional weight
- Add theory-error and error-on-error: handles bins that models can't fit
- Examine valley plots: identify flat parameters or those near bounds
- Aim to get $\chi^2/dof \sim 1$ and small-ish χ^2

Tune Results

```
PNAME                       PVALUE                  # COMMENT
StringFlav_probQQtoQ        0.0825                  #
StringFlav_probSQtoQQ       0.9018                  #
StringFlav_probStoUD        0.2048                  #
StringPT_sigma              0.3002                  #
StringZ_aExtraDiquark       0.5036                  #
StringZ_aExtraSQuark        0.3659                  #
StringZ_aLund               0.8220                  #
StringZ_avgZLund            0.5452                  #
TimeShower_alphaSvalue      0.1365                  # ONBOUND
TimeShower_pTmin            0.6253                  #
```

Froze alphaSvalue at Monash: otherwise it runs to largest value

Can we understand why?

Discussion

- Can get marginal global improvement on event shapes
- Tension between p/Λ x_p and $\Lambda\bar{\Lambda}$ correlations
- How important is the OPAL data?
- Is there additional data?
- Should we aim for a marginal change to Monash, and save full retune for later