LUX run04 binning revisited

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History

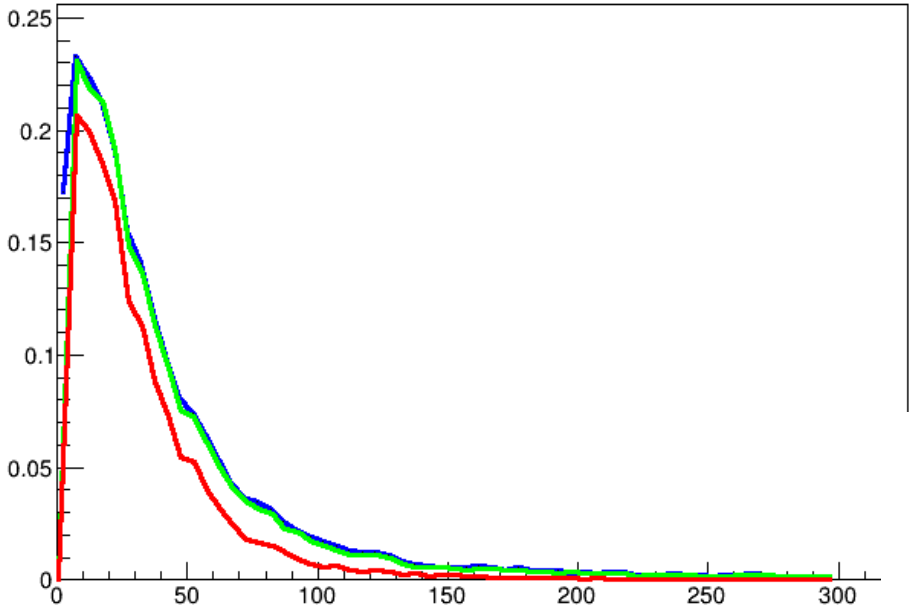
- Electric fields in LUX run04 went crazy
- Unable to correctly model S2/S1 as a function of electric field
- Solution: cut detector into bins, consider the field constant in each bin.
- Problem: S2/S1 bands *do* vary with field, and field *does* vary, so band in bin is wider than that of a single field.
- Solution: add a parameter that artificially widens the bands

Present

- NEST models the band response to field much better
- Could do away with artificially separating detector into bins, but…
  - Requires running a simulation of bands for each location (or alternatively each field) in the detector.
  - Requires a true 5D PDF instead of 3D x 2D
    - Roofit re-normalizes pdfs each time a value is drawn
- Could we do one big bin that just models the band correctly? (instead of assuming one field and creating an artificial parameter to widen)

Answer:

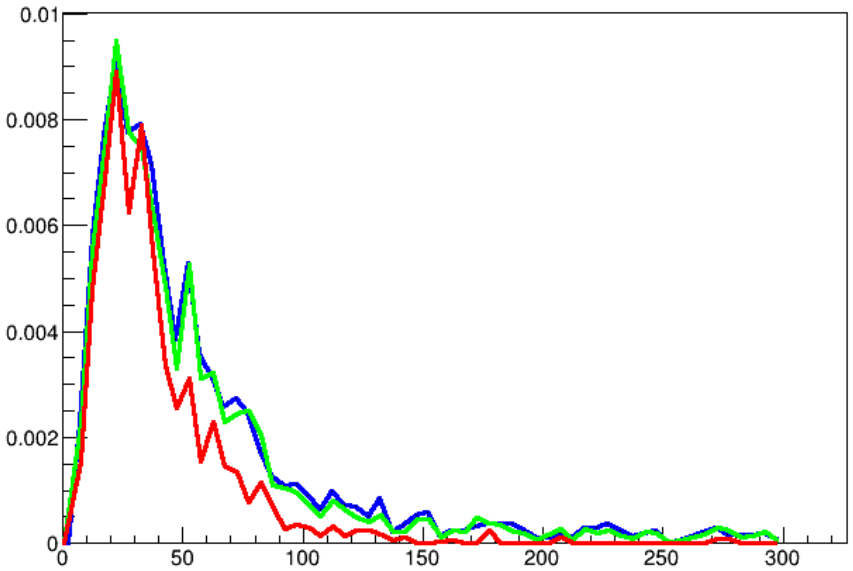
ER -> NR Leakage fraction (+2 sigma)



S1

- Probably not

ER -> NR Leakage fraction (mean)



S1

Blue: one big bin
Green: time-bins only (4 of them)
Red: time-bins + z-slices (4 and 4)