

Stripe scans

“Olga-Veta” method

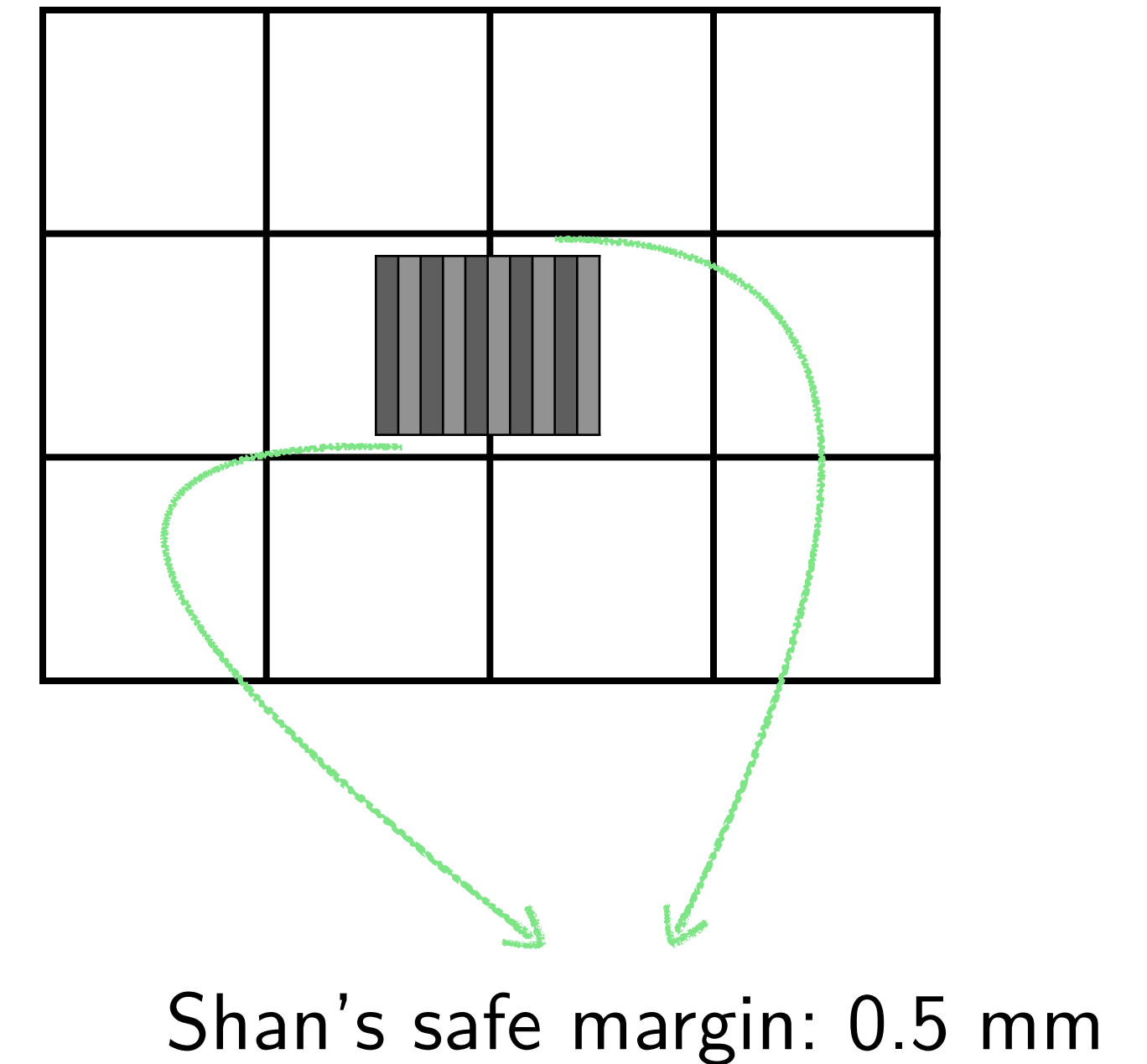
shan@tauex.tau.ac.il

work in progress

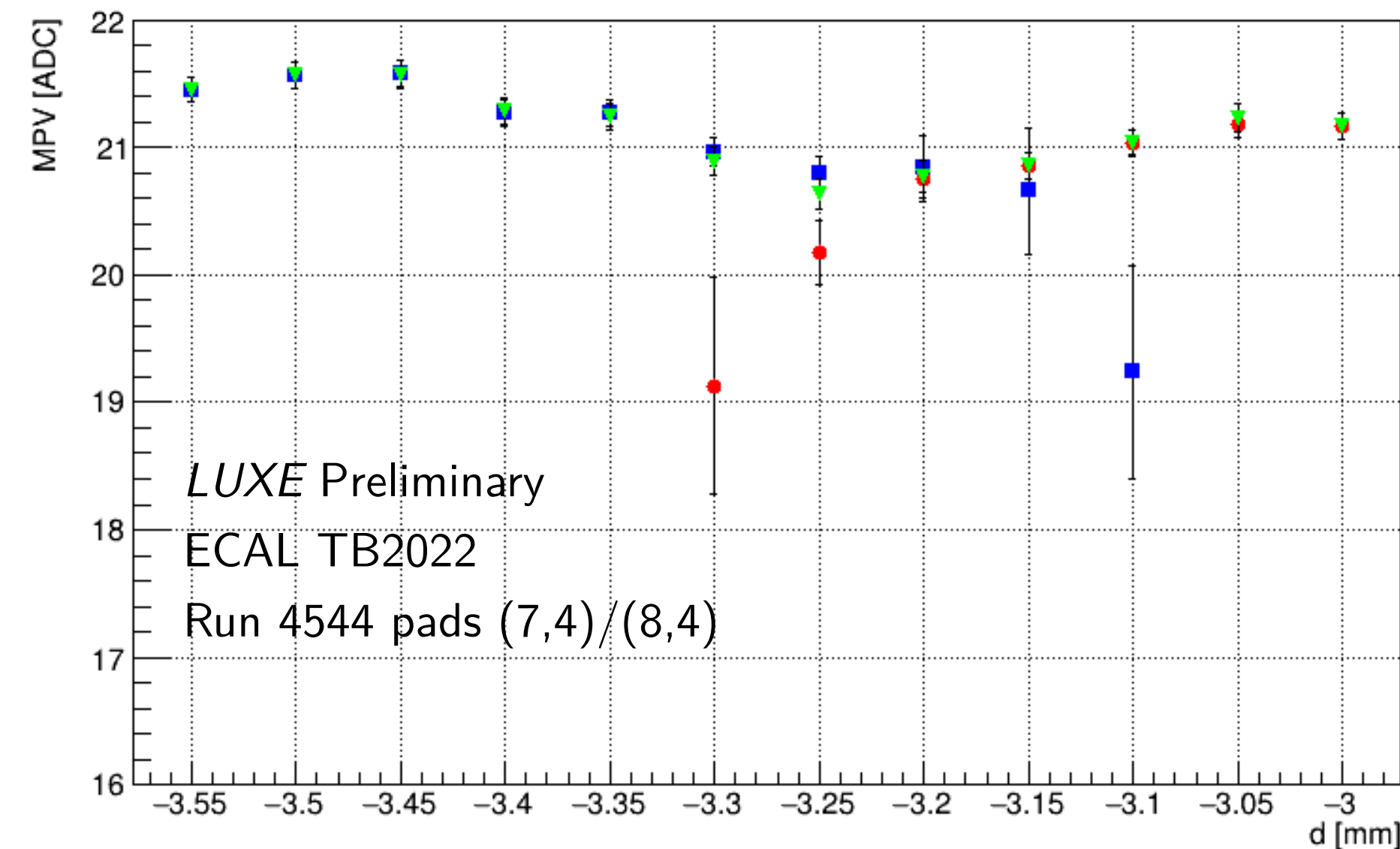
30 April 2023

Signal sharing via stripe scan

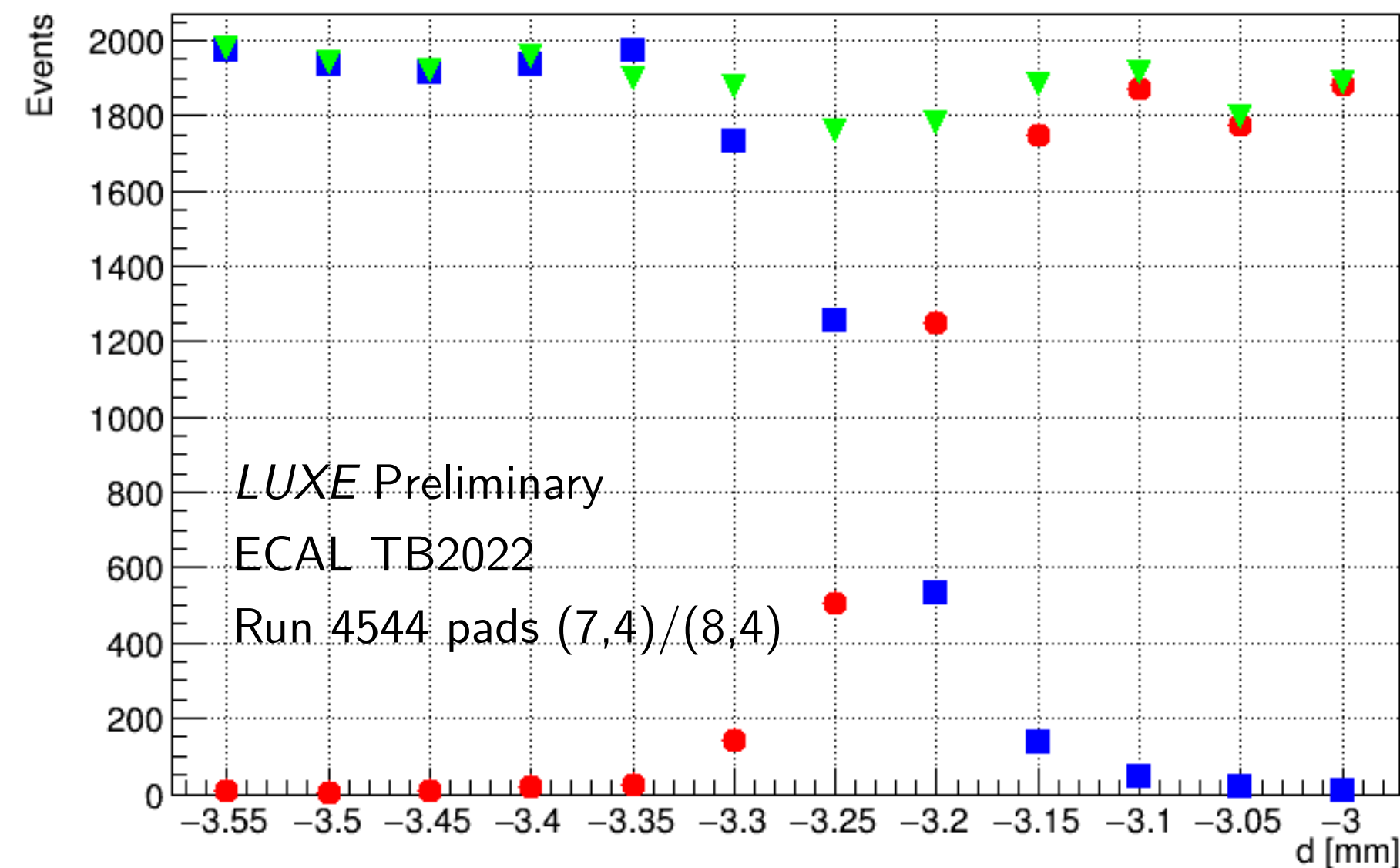
- Focusing electron on a stripe
- Check the responses of two neighbouring stripes and their sum
- Veta's scan on C74 shows immediate drop/rise of signal after passing the boundary
 - Gap size for CALICE: 10 μm (pixel pitch 5.5 mm)
 - Gap size for GaAs: 300 μm (pixel pitch 5.0 mm)
 - Resolution of telescope prediction on SUT: 50-100 μm
- New Landau-Gaussian fitting codes from Malinda (Katja's student)
 - χ^2/ndof very close to 1, shown in BTTB workshop
 - still trying to adapt it $\Rightarrow$ no fitting yet in this slides



Veta's result



Signal



Event number

Blue: left pad
Red: right pad
Green: sum of two pads

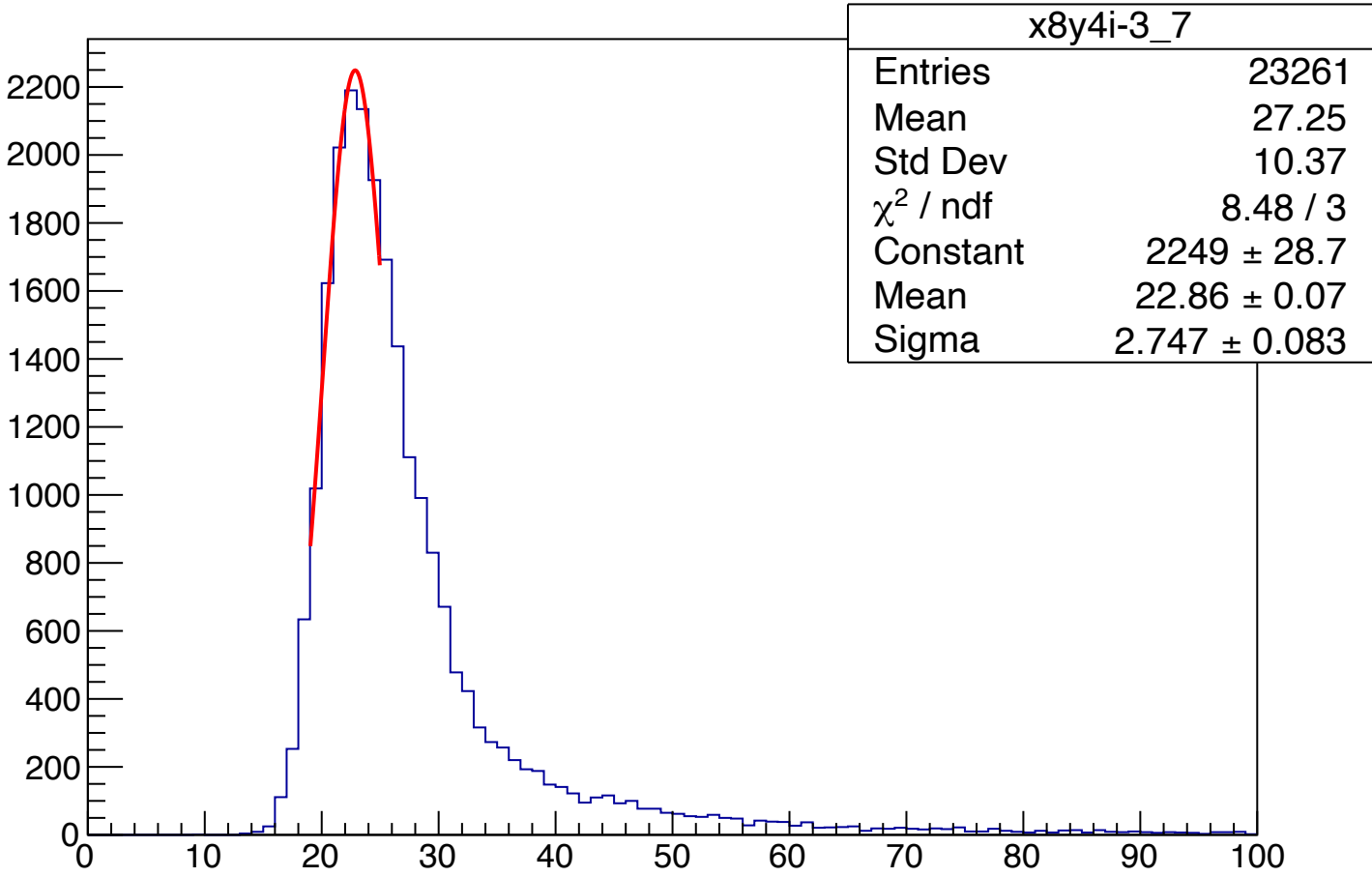
Step: 50 μ m

- Next three slides are the reproduction of Olga-Veta's results with Calice C75 sensor
 - Focusing electron onto a vertical stripe region (χ^2/ndof cut at 5)
 - Check the response of the left neighbouring pad
 - Check the response of the right neighbouring pad
 - Check the sum of two responses

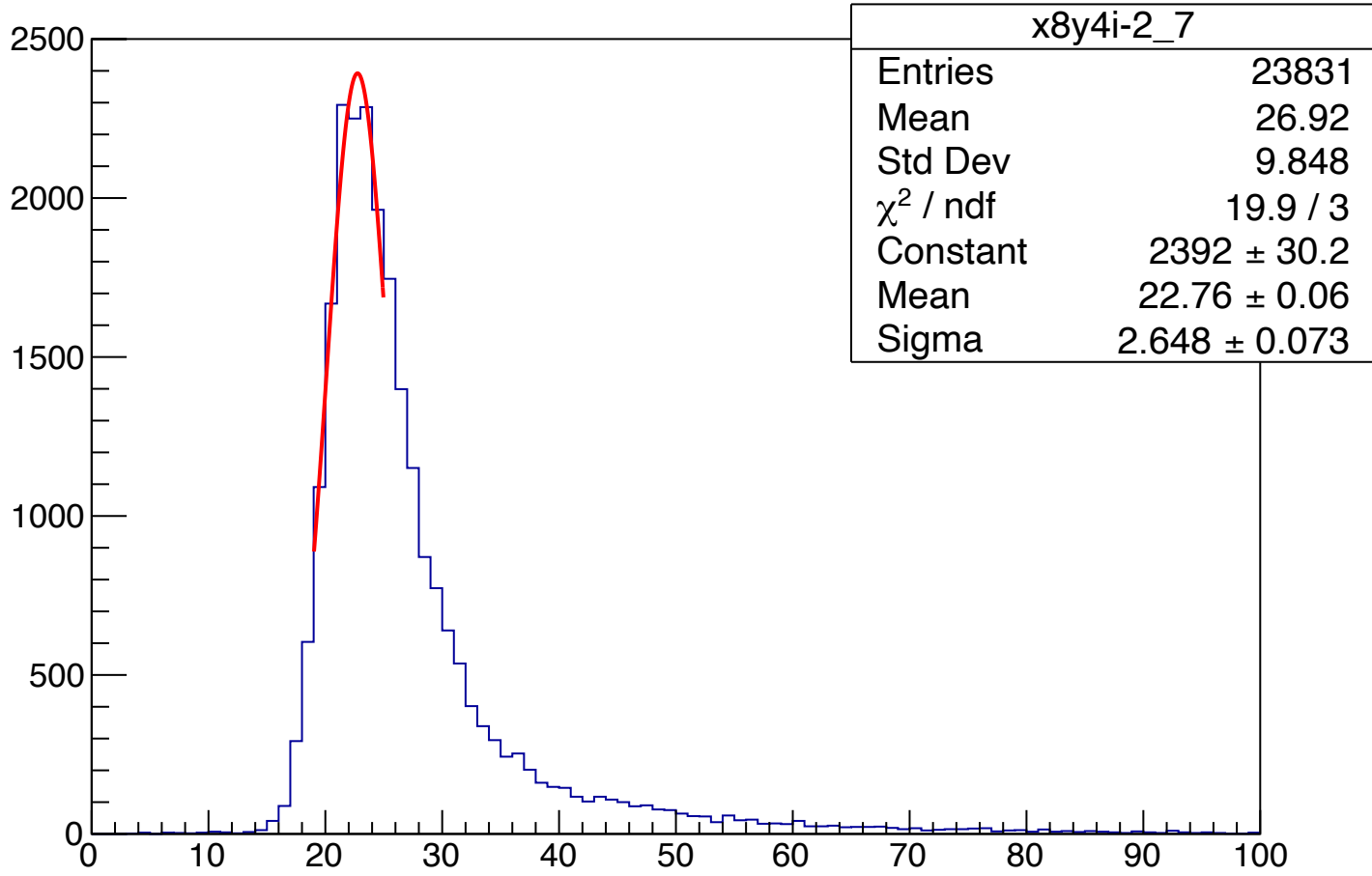
Step: 125 um

Reproduce on C75: Left pad

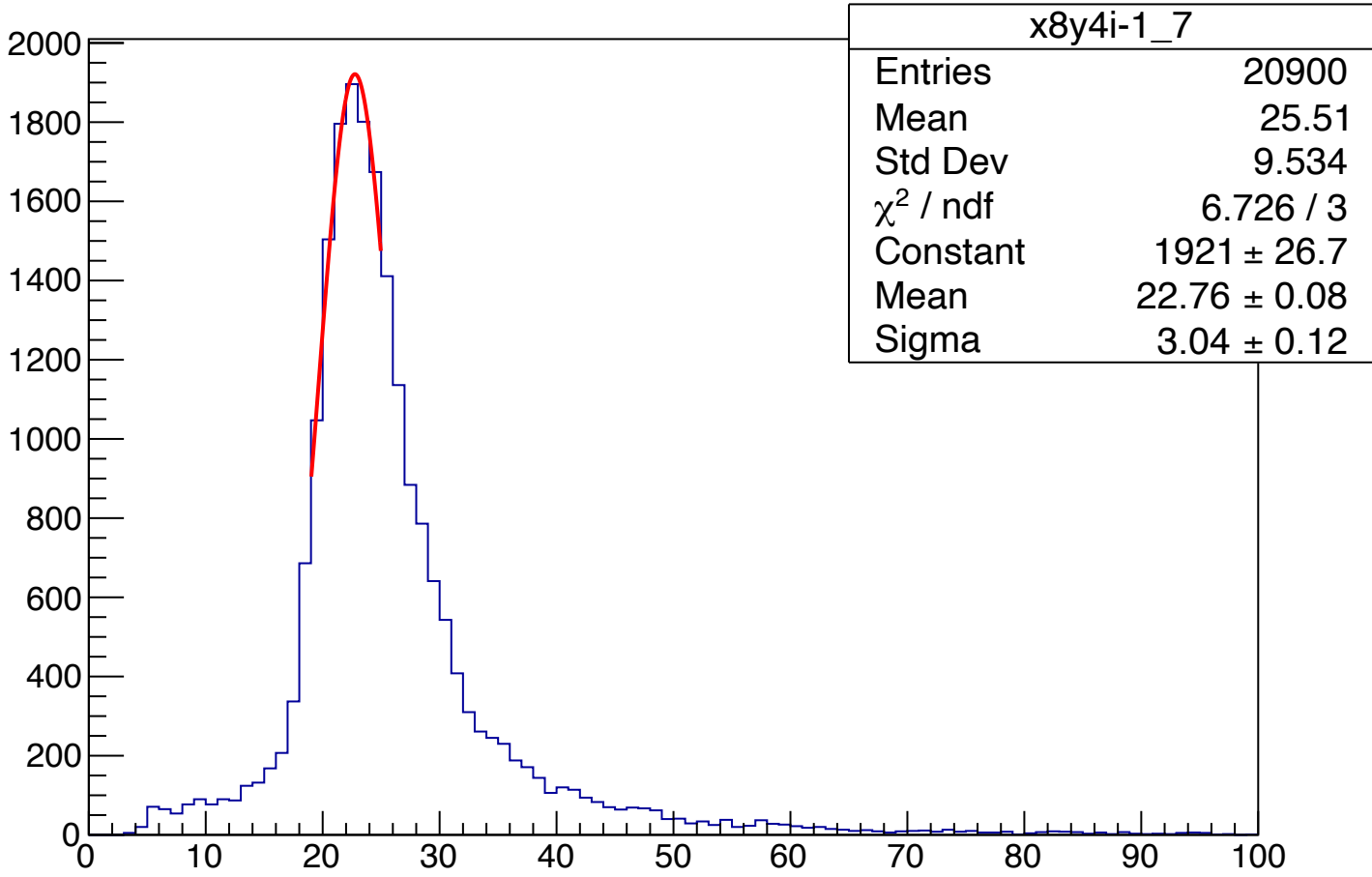
X Scan Stripe (7.93, 4) Left pad



X Scan Stripe (7.95, 4) Left pad



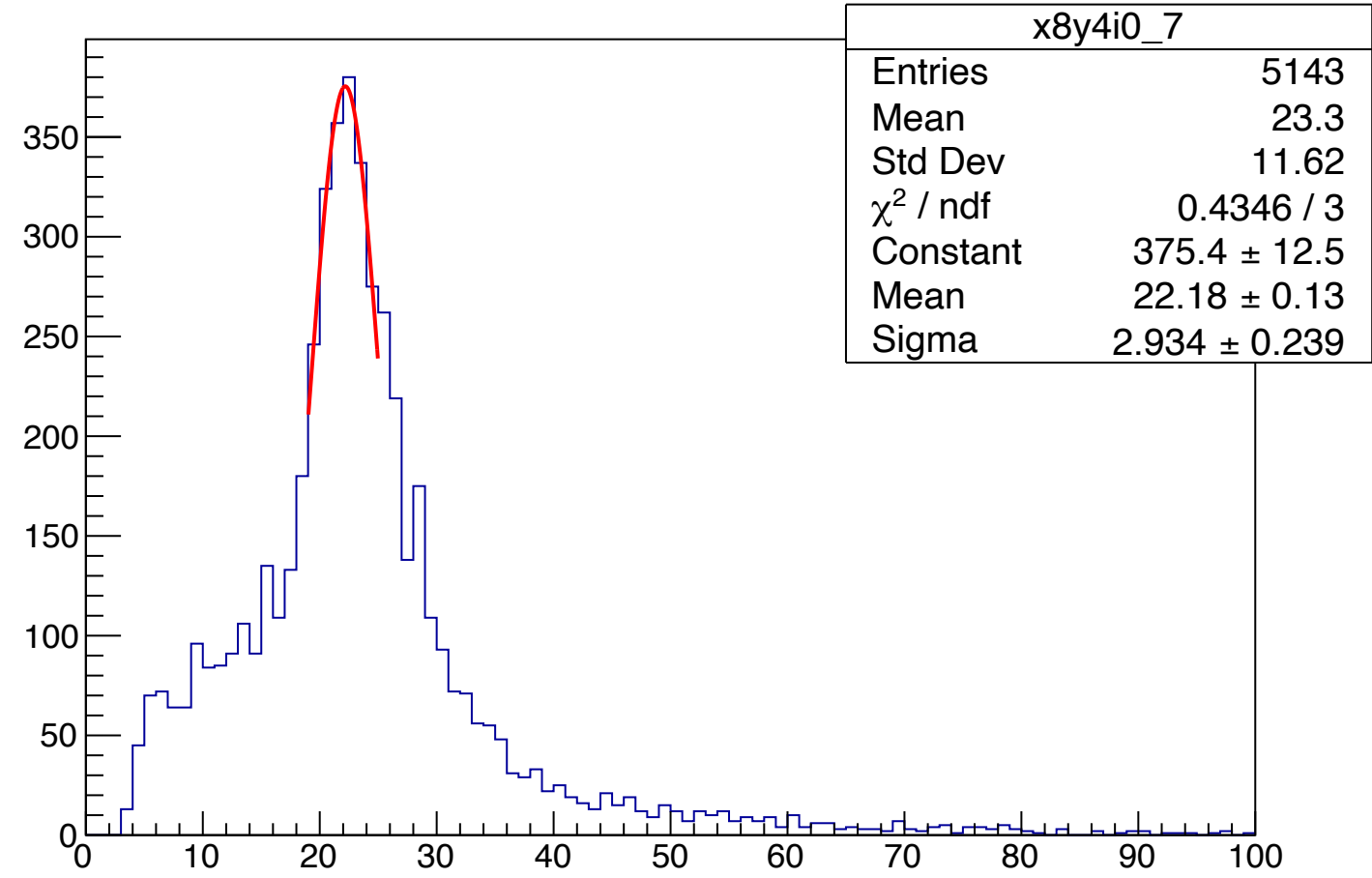
X Scan Stripe (7.98, 4) Left pad



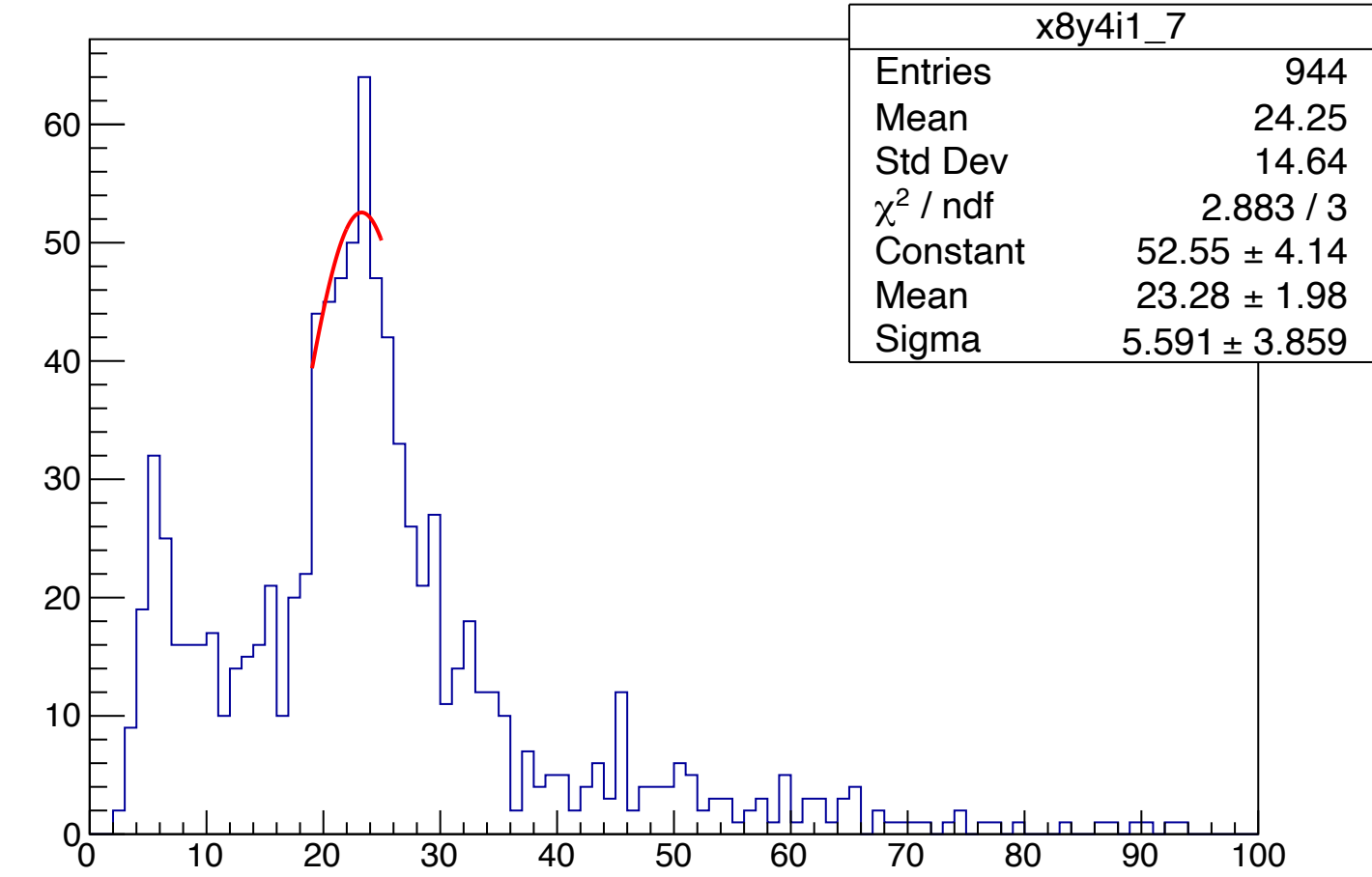
Pad (7,4)

Boundary

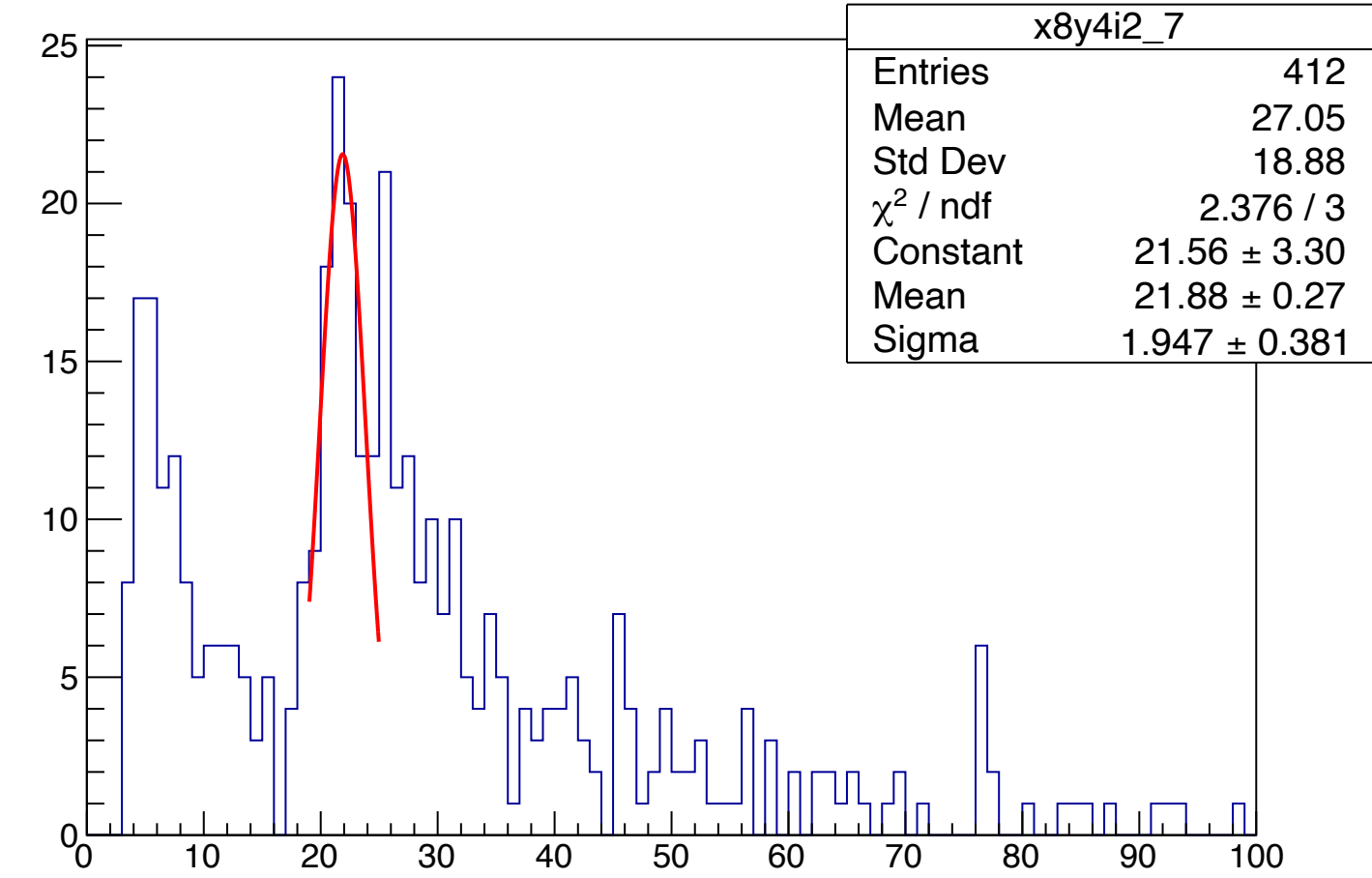
X Scan Stripe (8.00, 4) Left pad



X Scan Stripe (8.02, 4) Left pad



X Scan Stripe (8.05, 4) Left pad



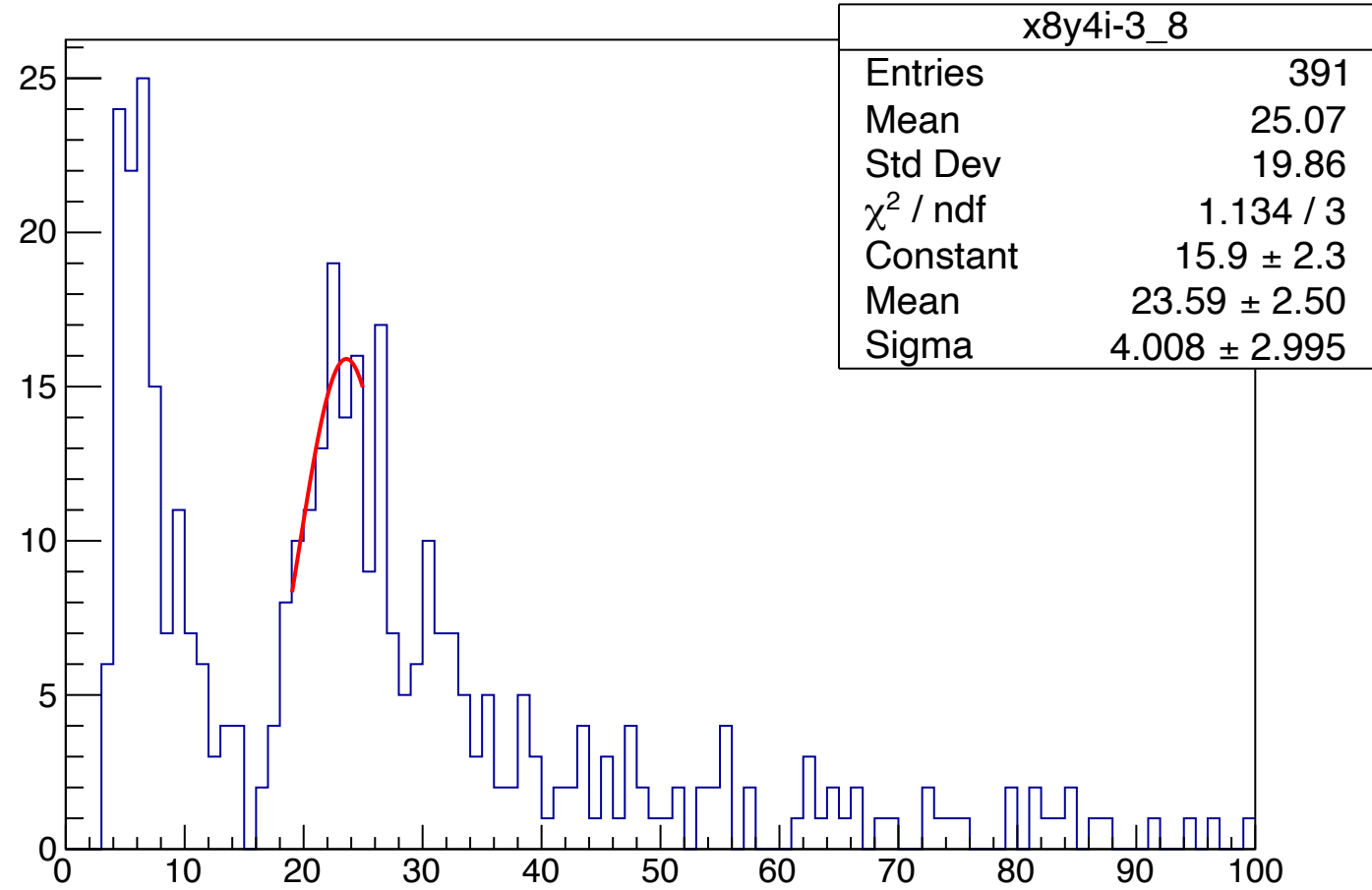
Boundary

Pad (8,4)

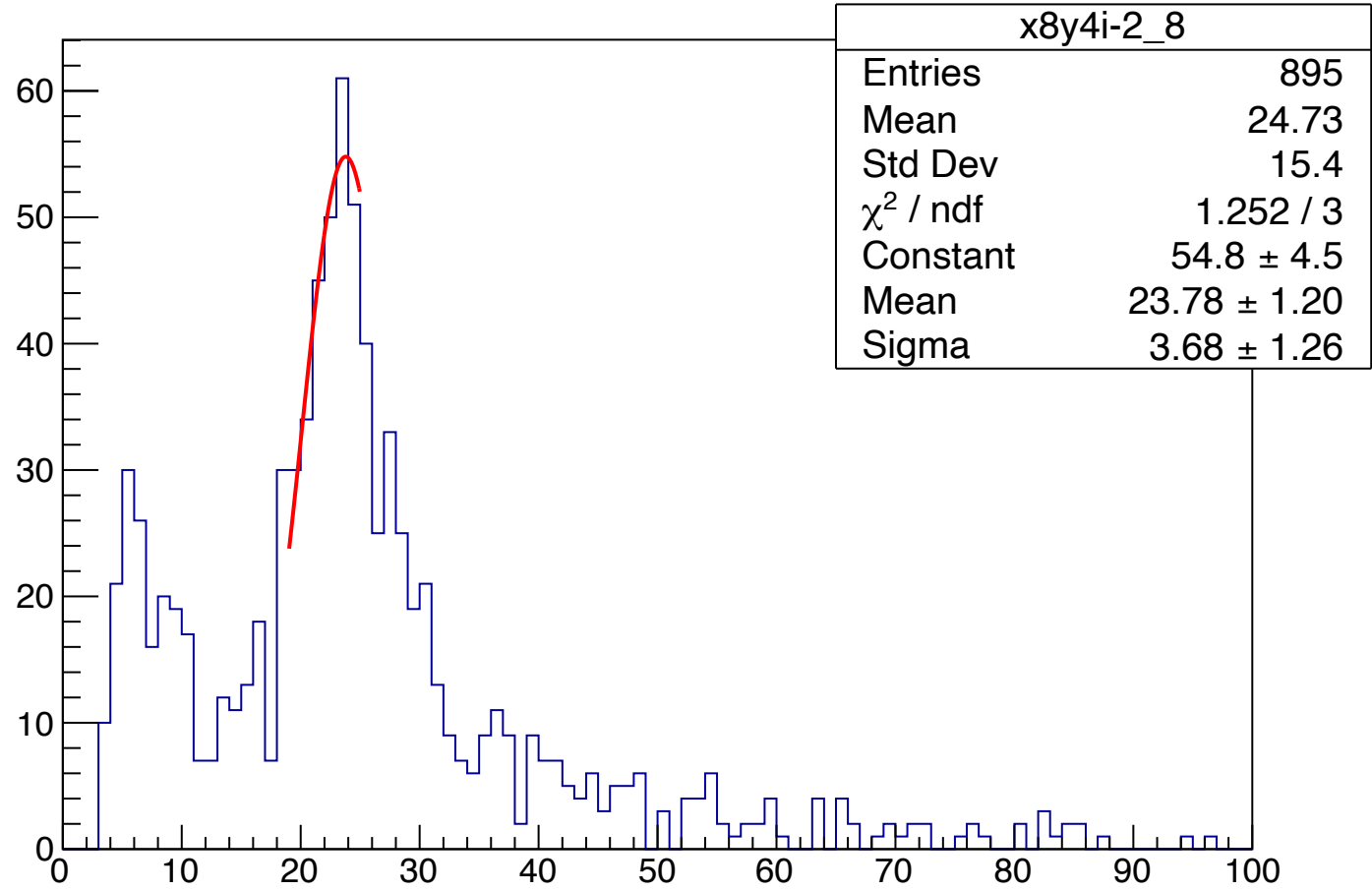
Step: 125 um

Reproduce on C75: Right pad

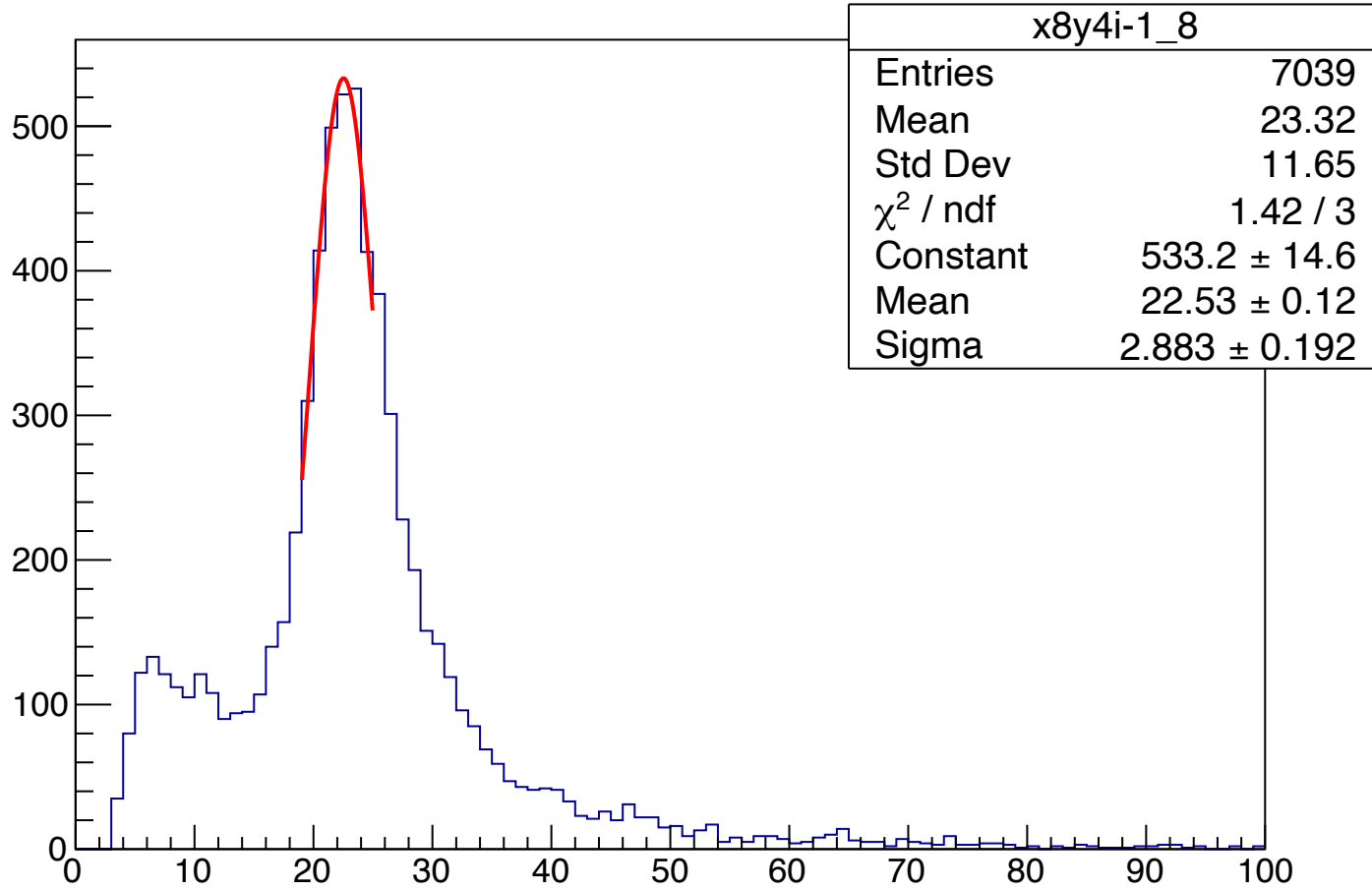
X Scan Stripe (7.93, 4) Right pad



X Scan Stripe (7.95, 4) Right pad



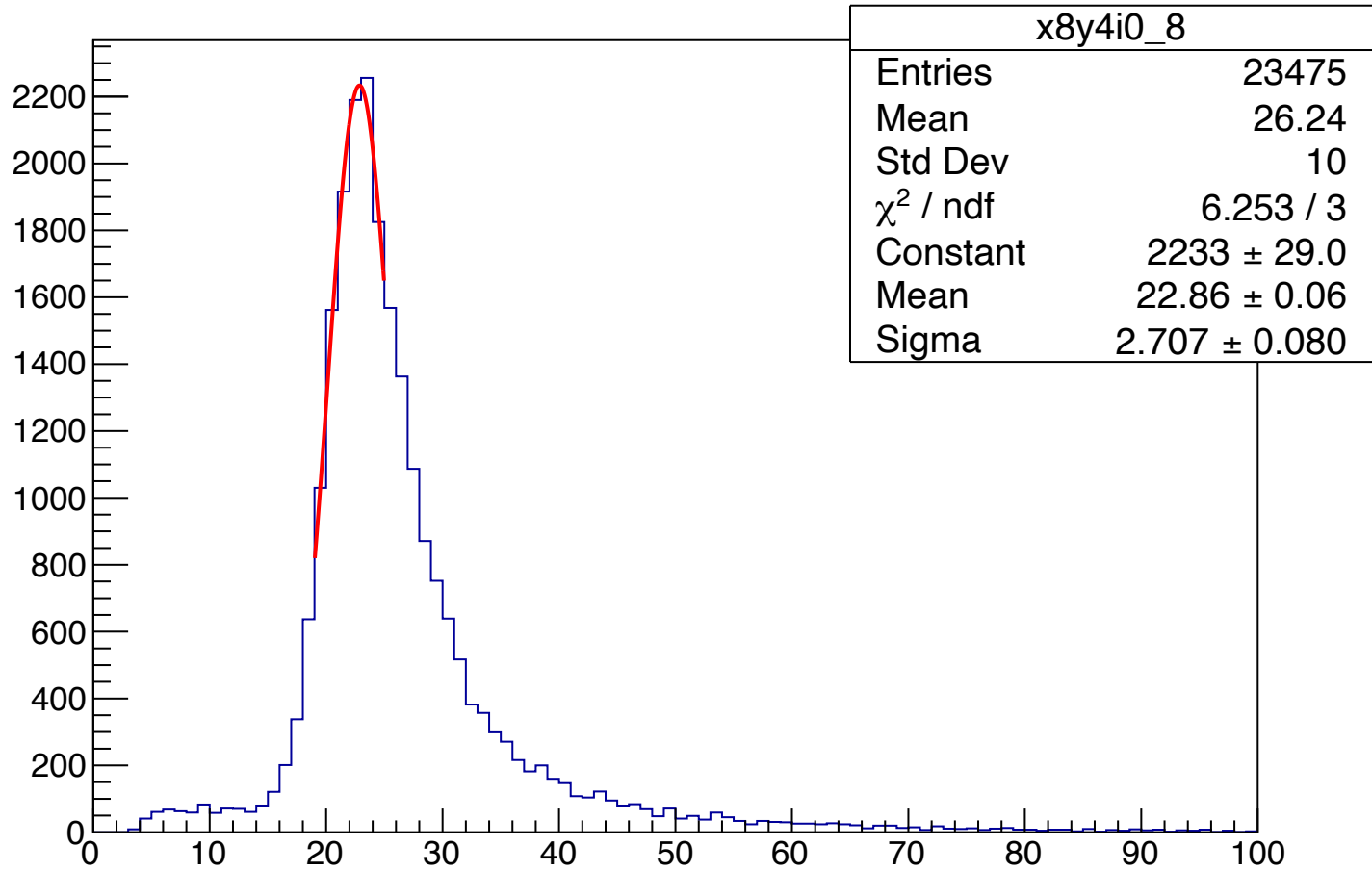
X Scan Stripe (7.98, 4) Right pad



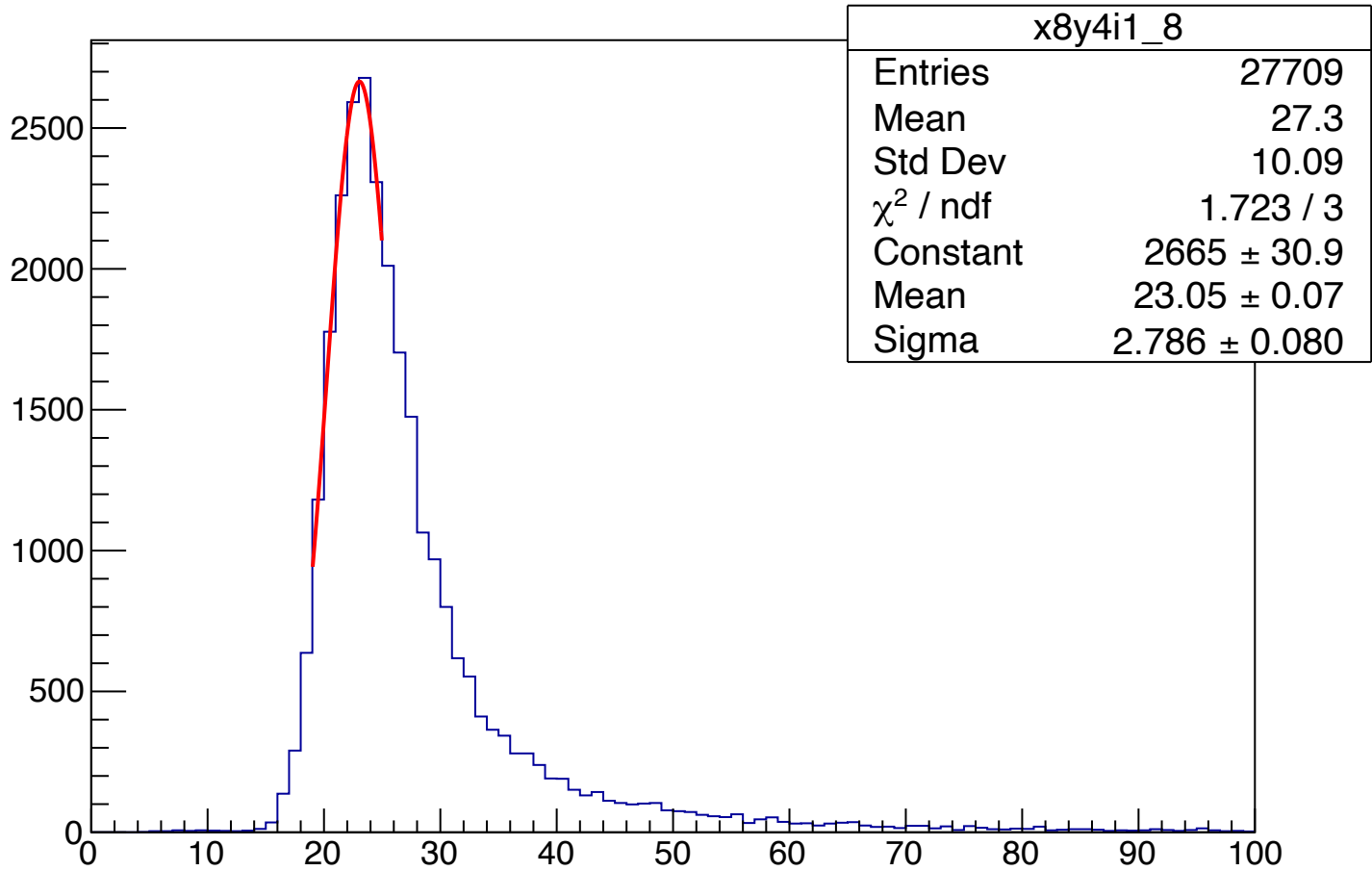
Pad (7,4)

Boundary

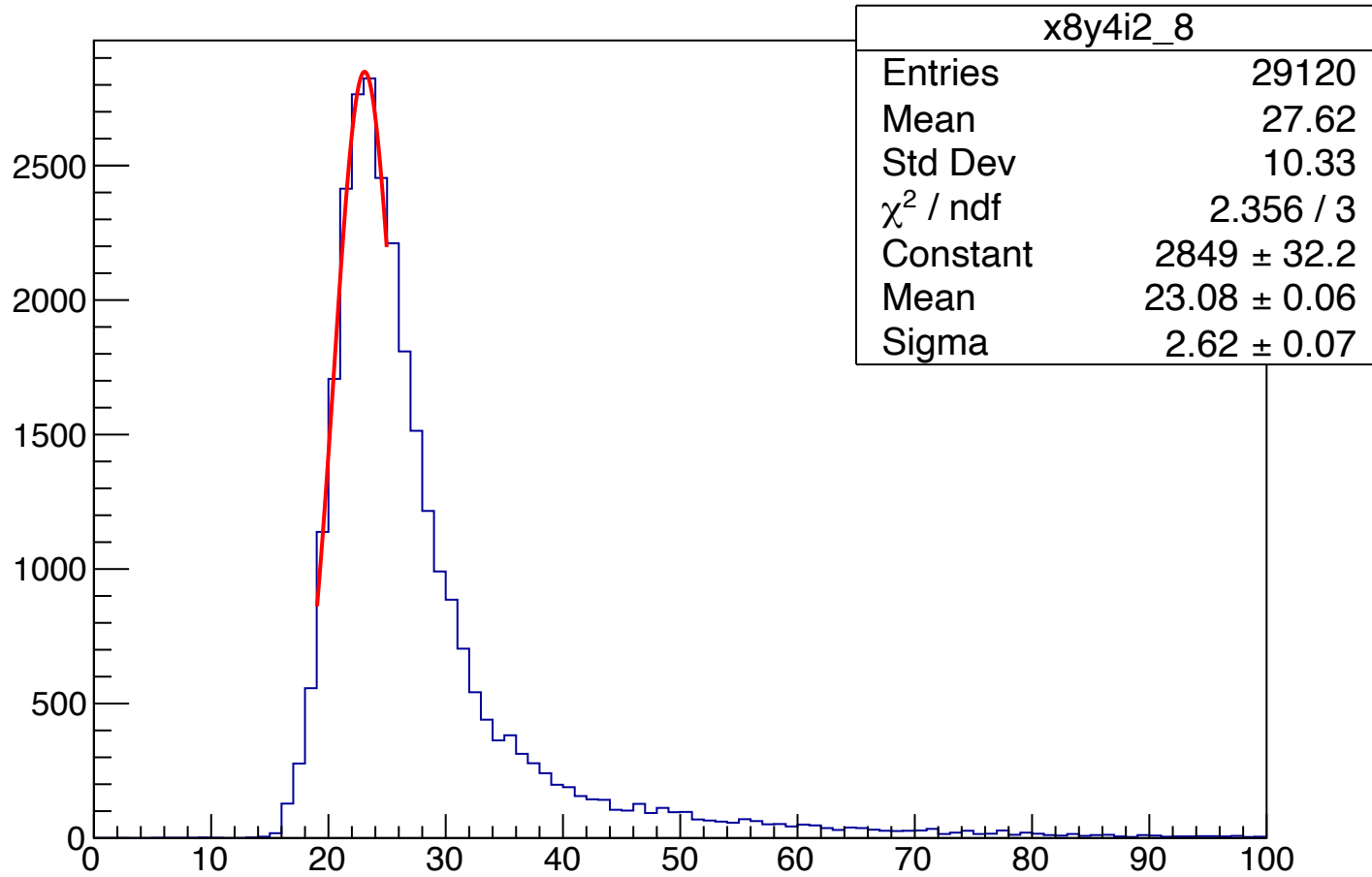
X Scan Stripe (8.00, 4) Right pad



X Scan Stripe (8.02, 4) Right pad



X Scan Stripe (8.05, 4) Right pad



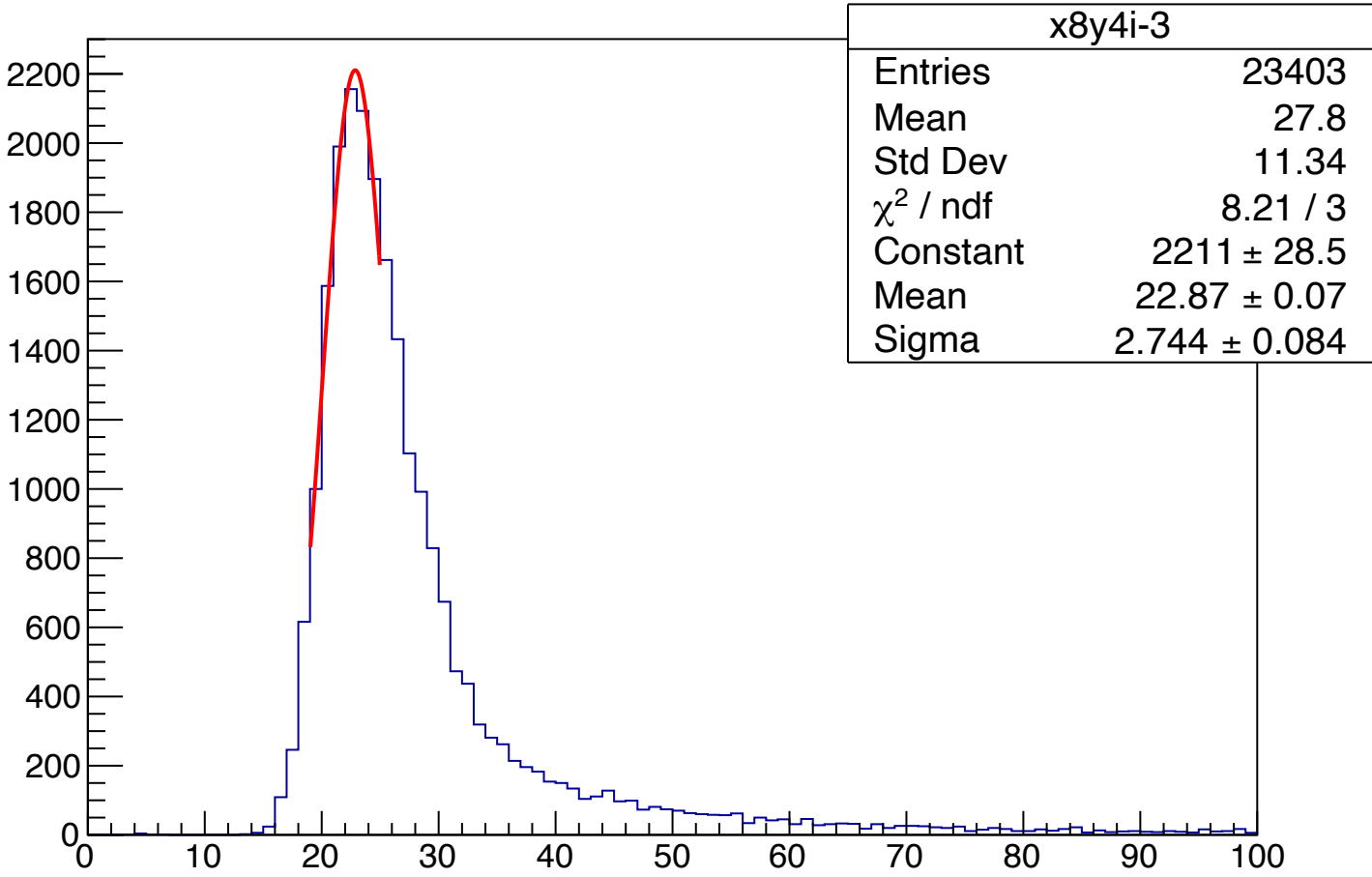
Boundary

Pad (8,4)

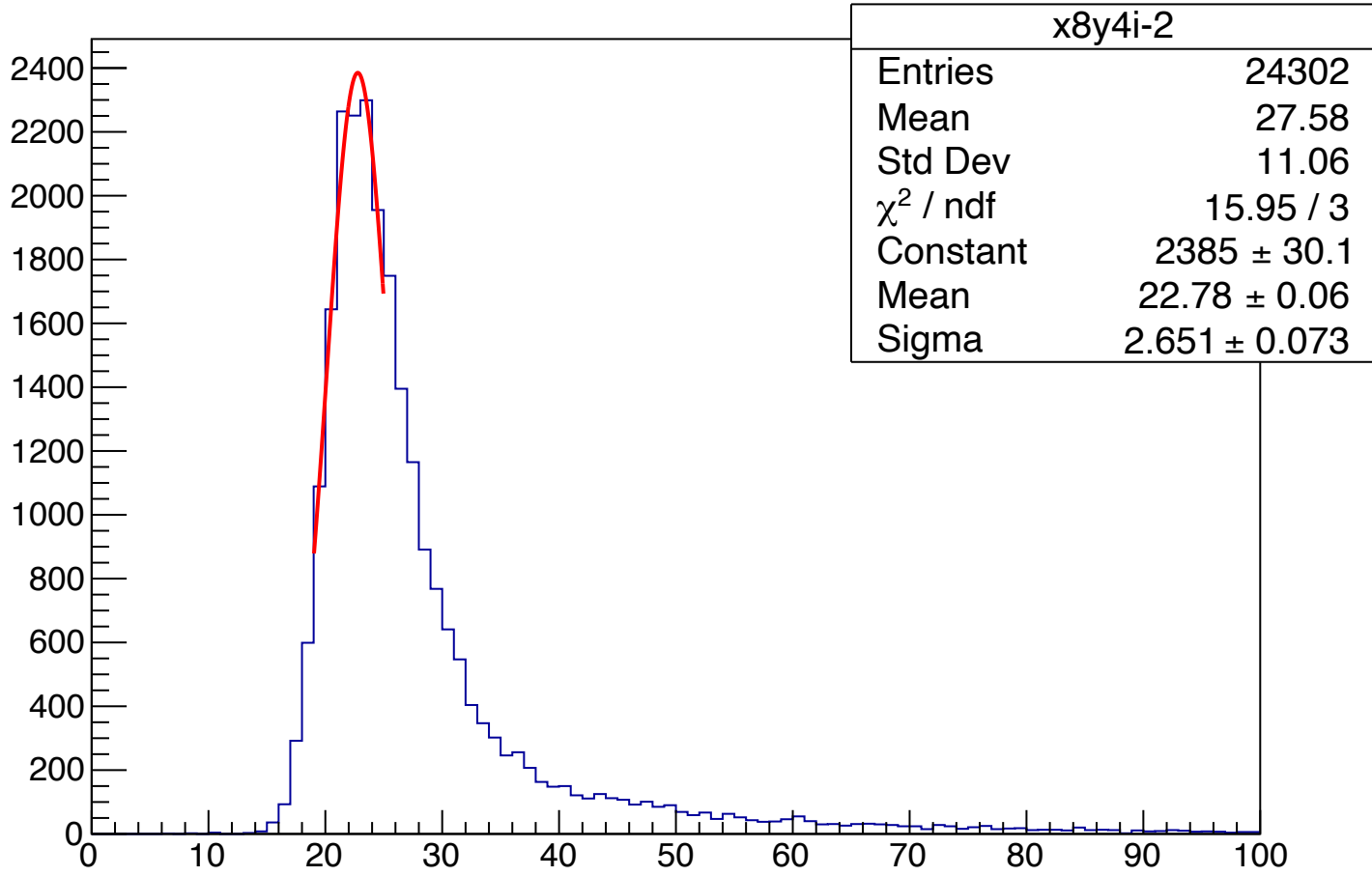
Step: 125 um

Reproduce on C75: Sum of two pads

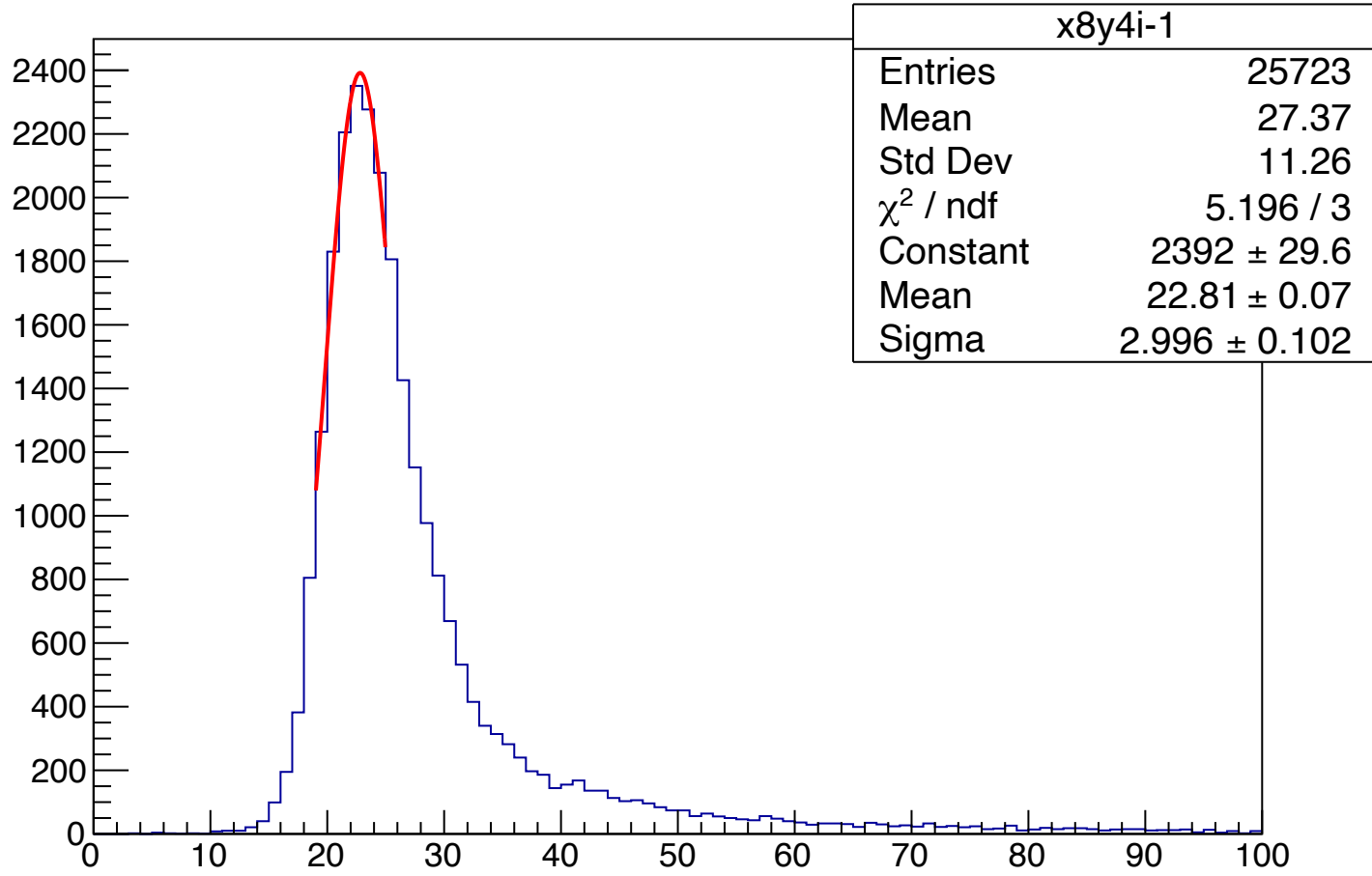
X Scan Stripe (7.93, 4) Sum of pads



X Scan Stripe (7.95, 4) Sum of pads



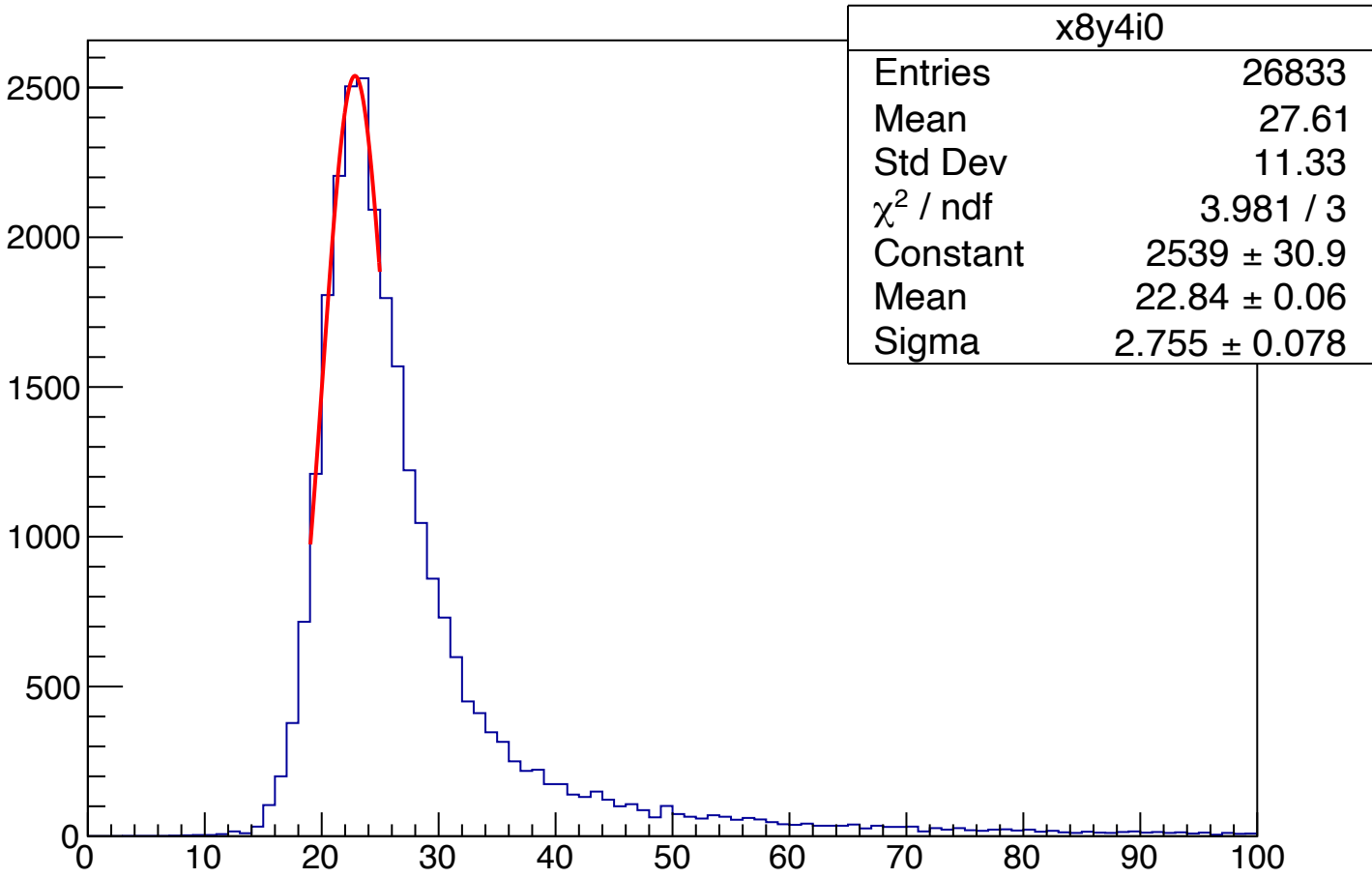
X Scan Stripe (7.98, 4) Sum of pads



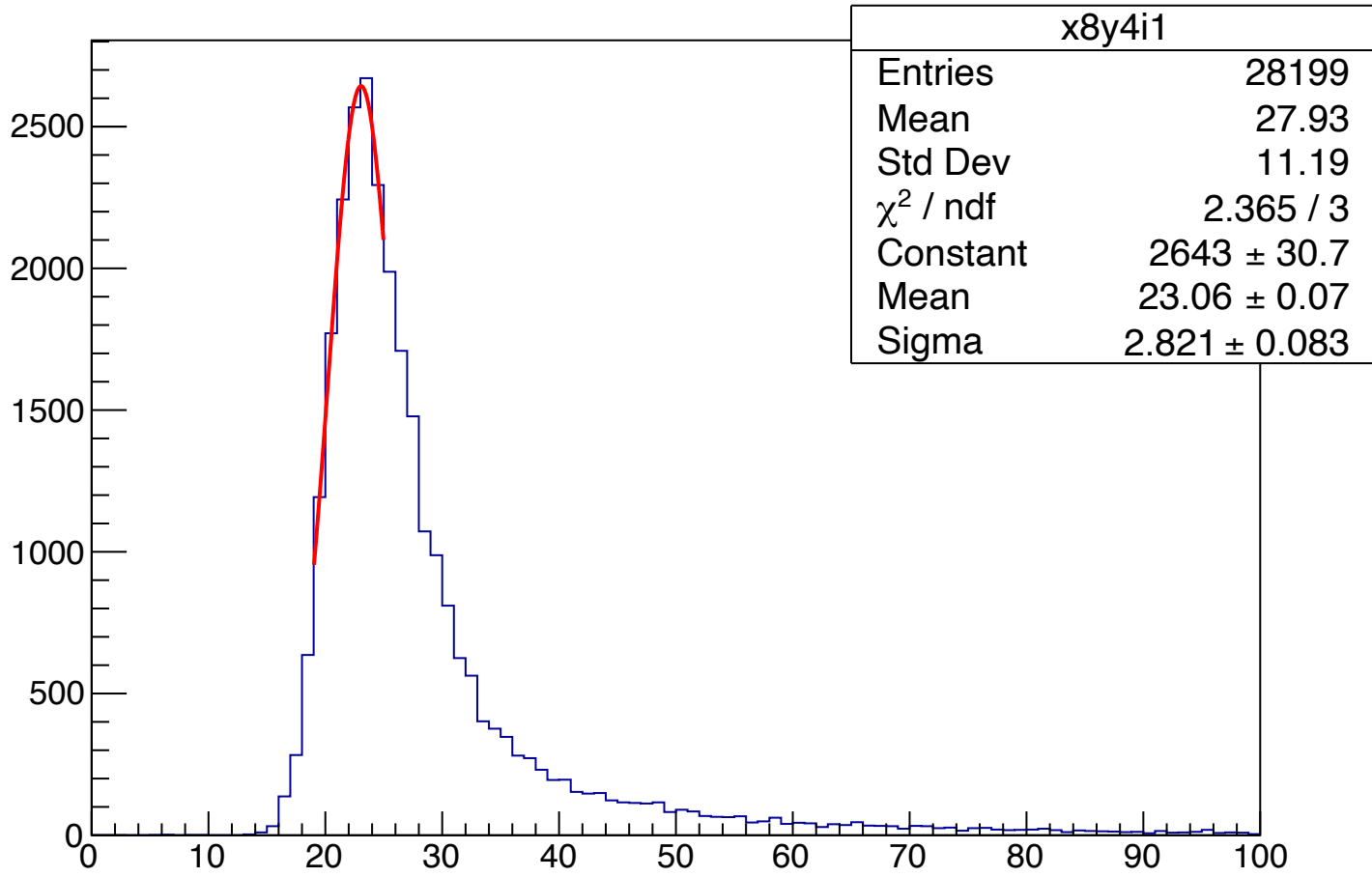
Pad (7,4)

Boundary

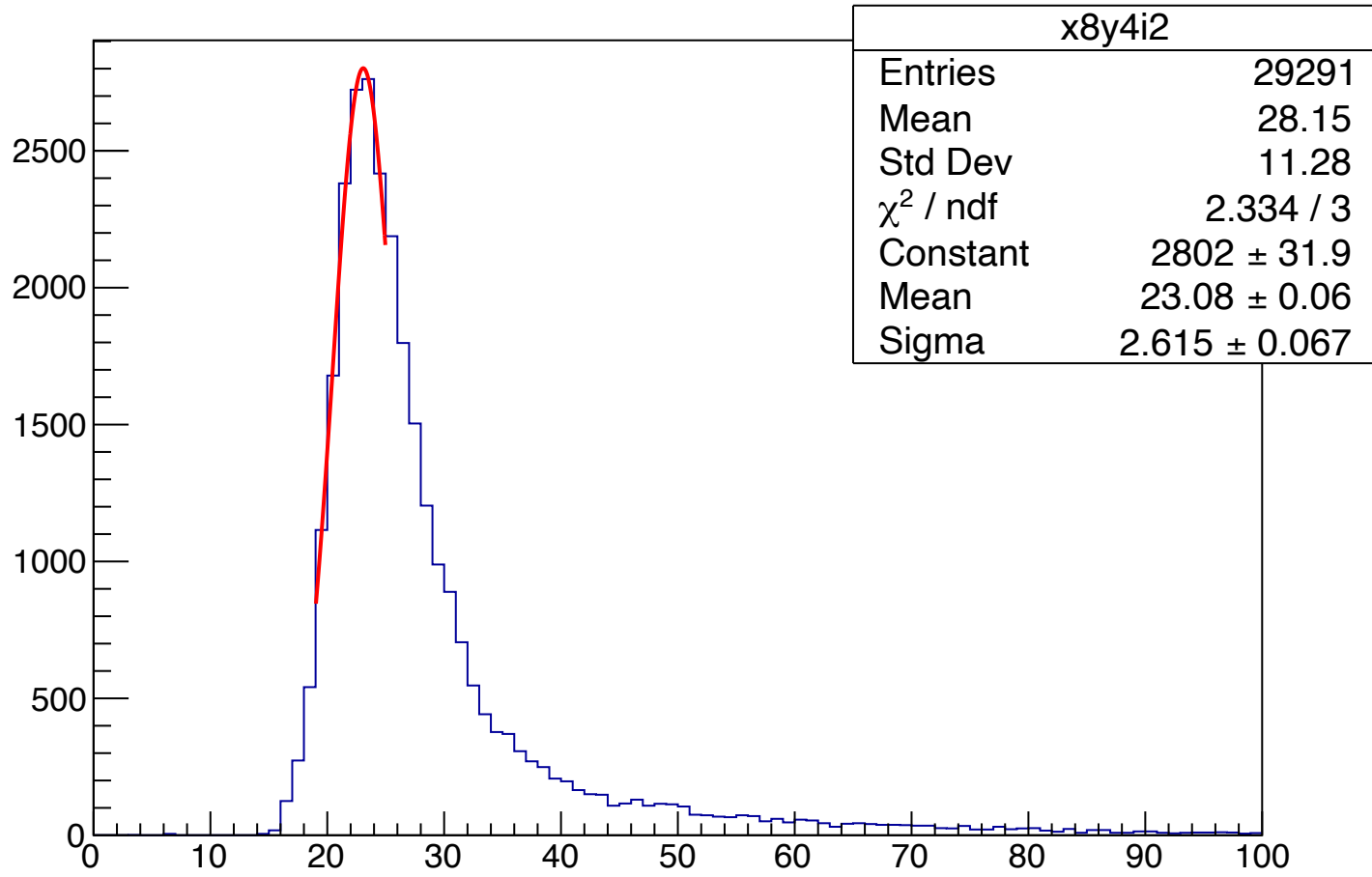
X Scan Stripe (8.00, 4) Sum of pads



X Scan Stripe (8.02, 4) Sum of pads



X Scan Stripe (8.05, 4) Sum of pads



Boundary

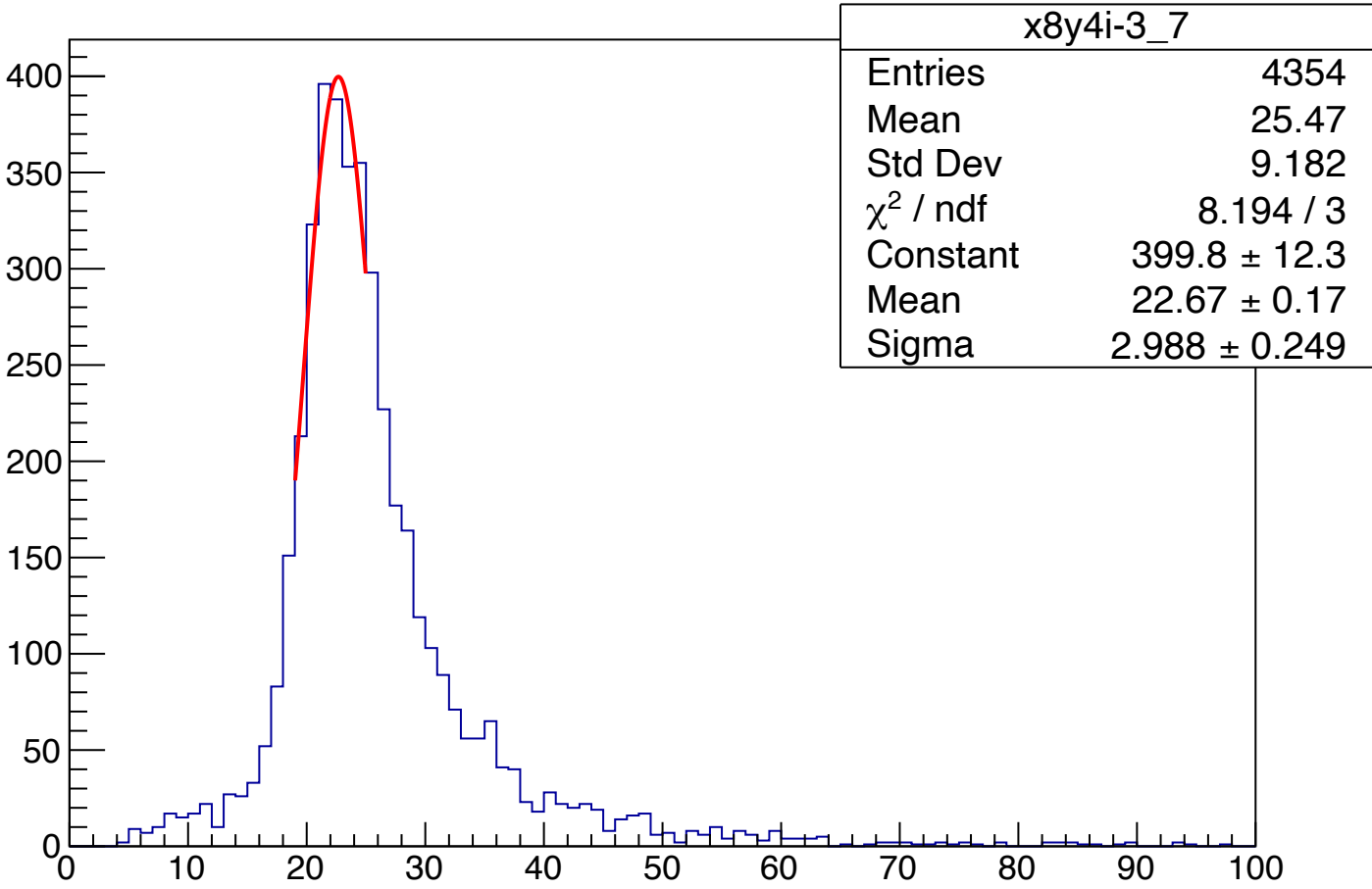
Pad (8,4)

- It is difficult to see signal sharing at 125 μm stripe, because the gap is much smaller
- In the next three slides, the stripe size will be changed to 25 μm , with χ^2 cut at 2

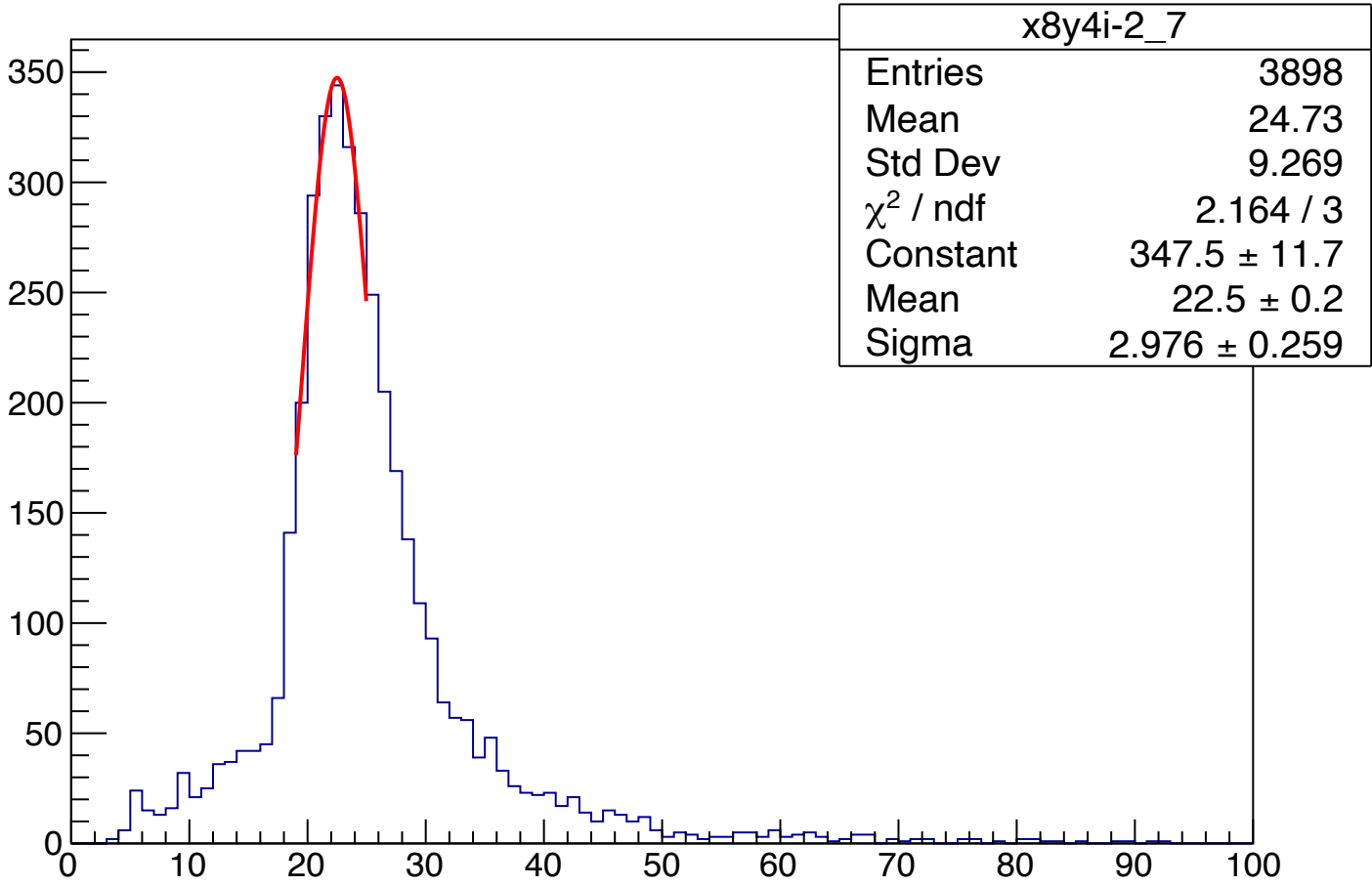
Step: 25 um

Reproduce on C75: Left pad

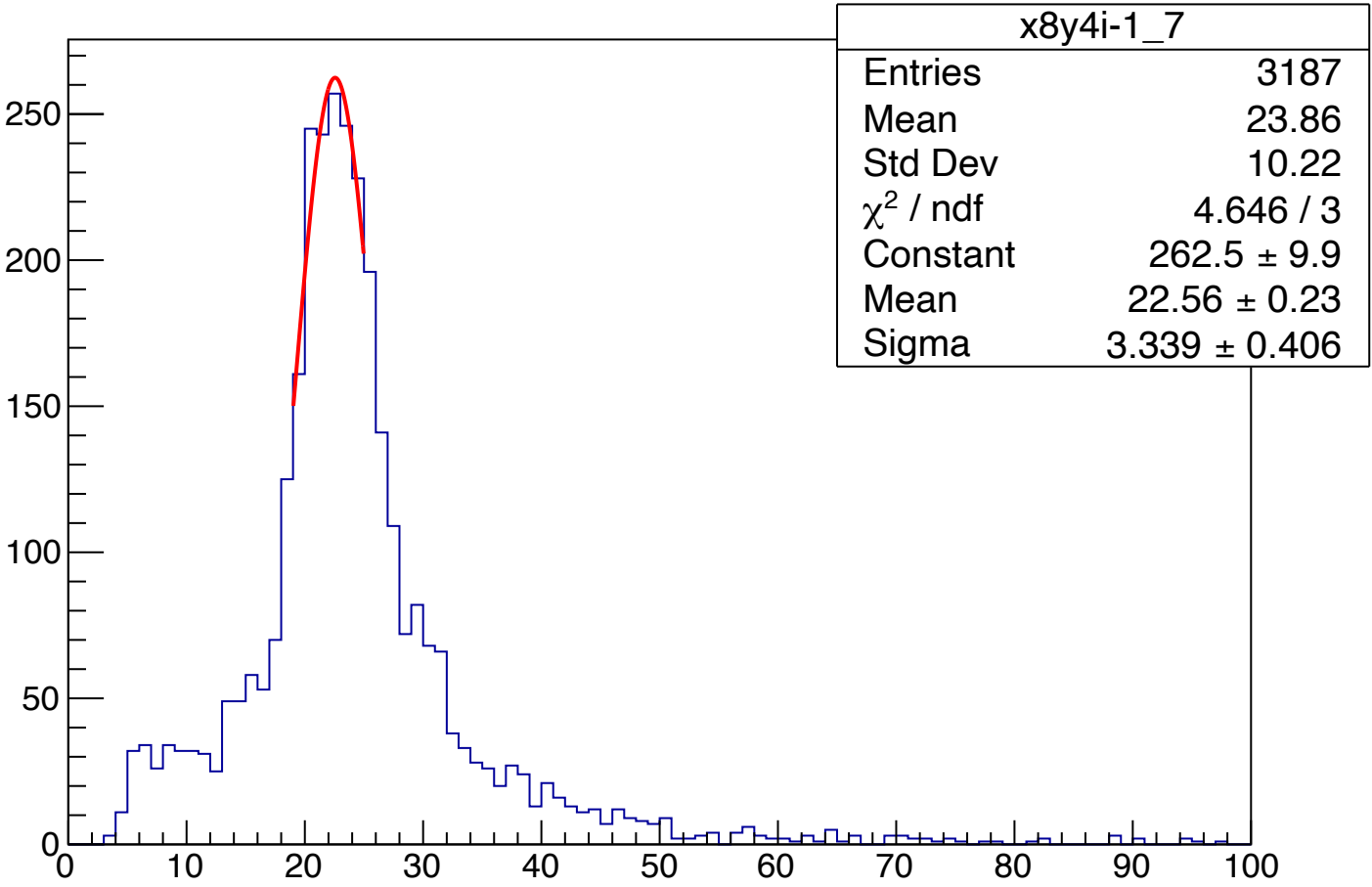
X Scan Stripe (7.99, 4) Left pad



X Scan Stripe (7.99, 4) Left pad



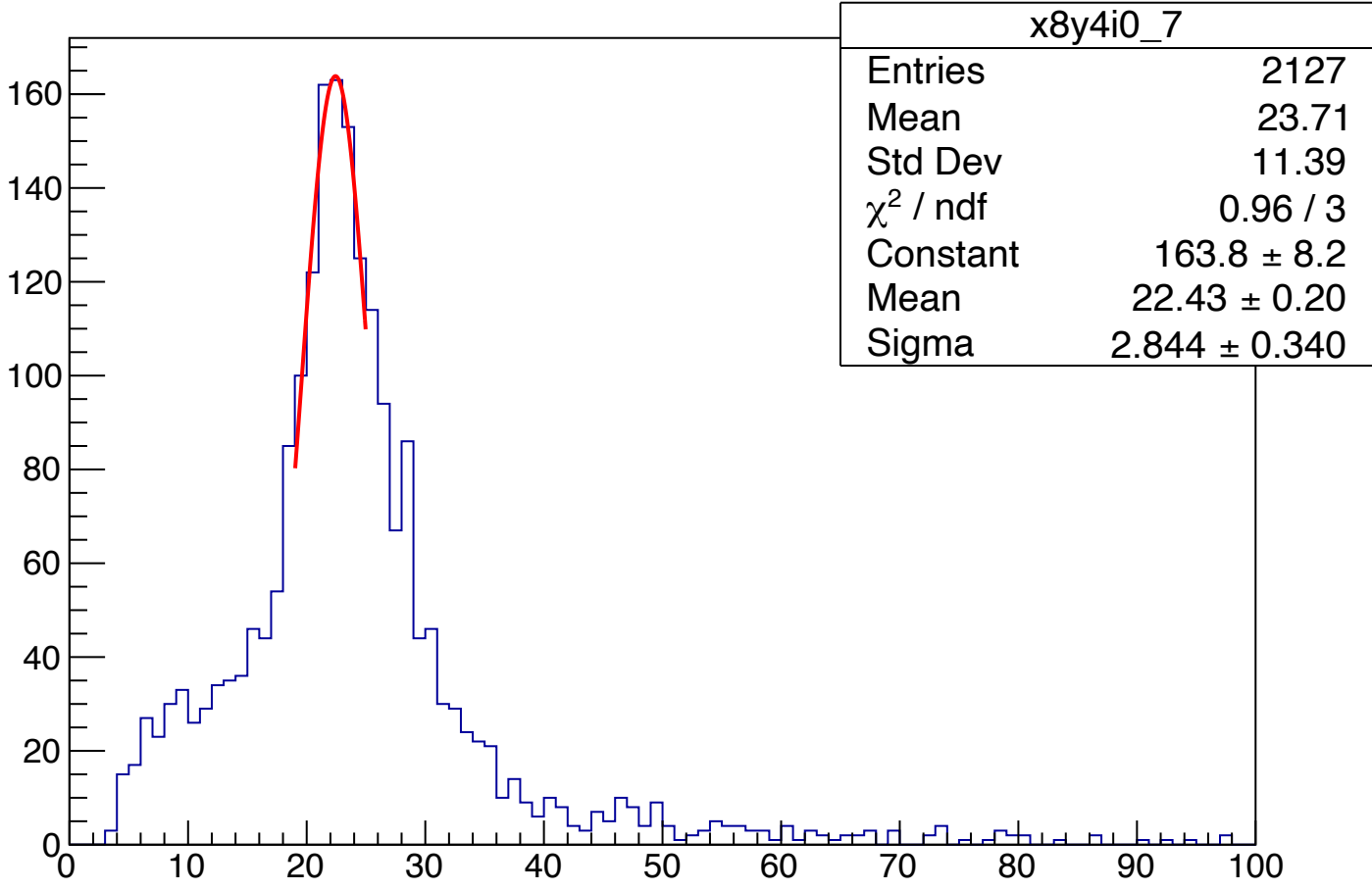
X Scan Stripe (8.00, 4) Left pad



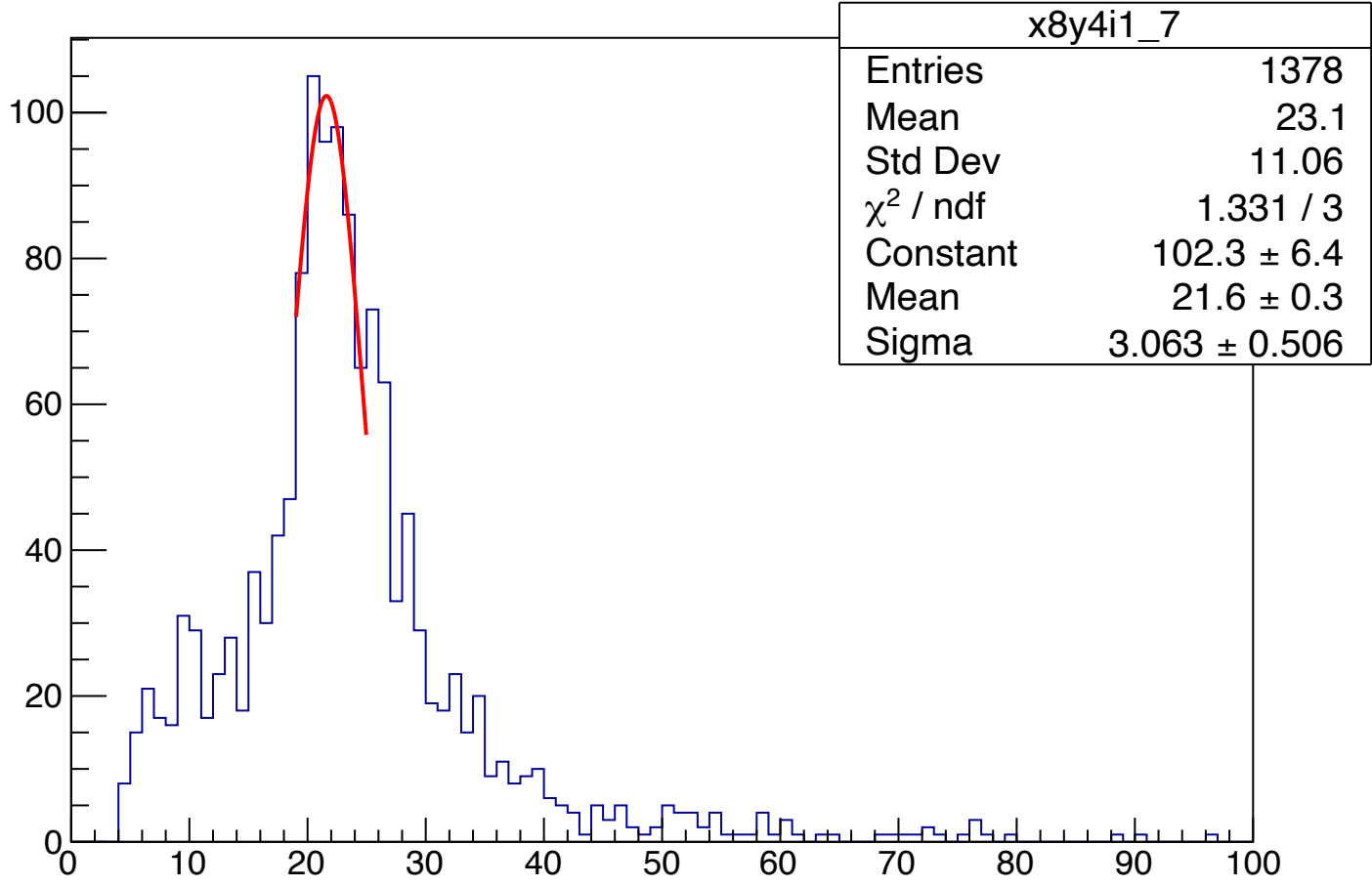
Pad (7,4)

Boundary

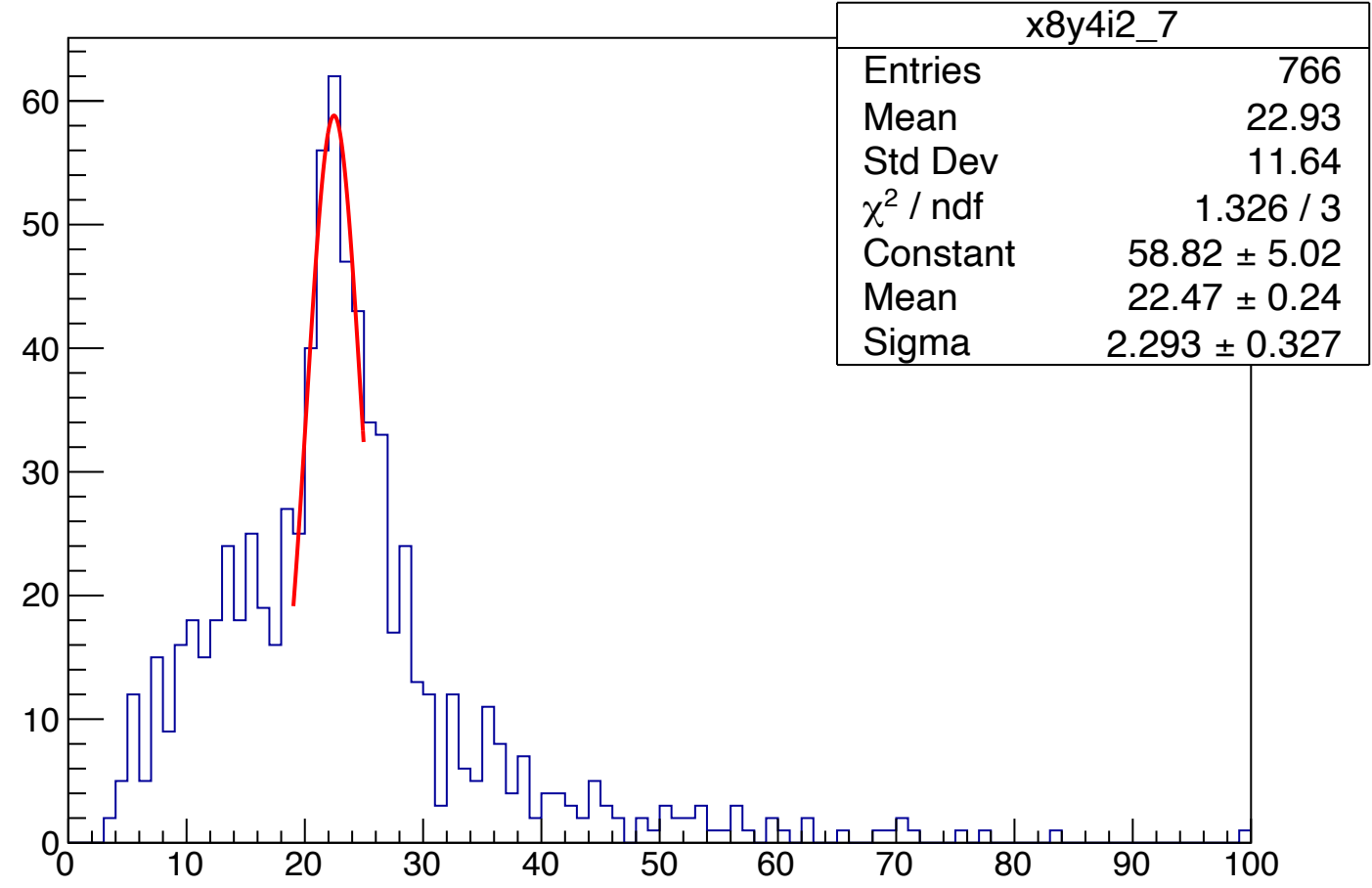
X Scan Stripe (8.00, 4) Left pad



X Scan Stripe (8.00, 4) Left pad



X Scan Stripe (8.01, 4) Left pad



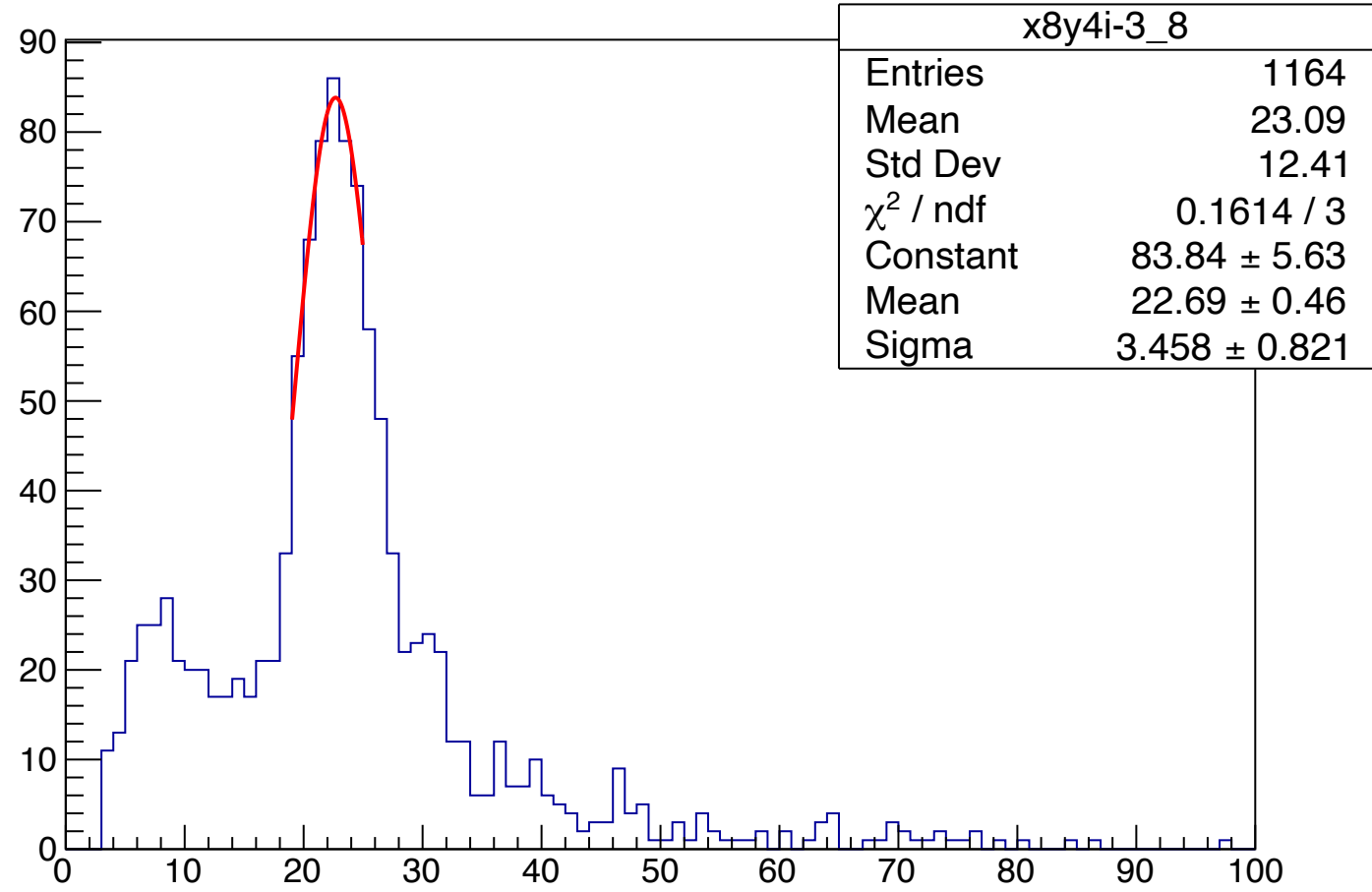
Boundary

Pad (8,4)

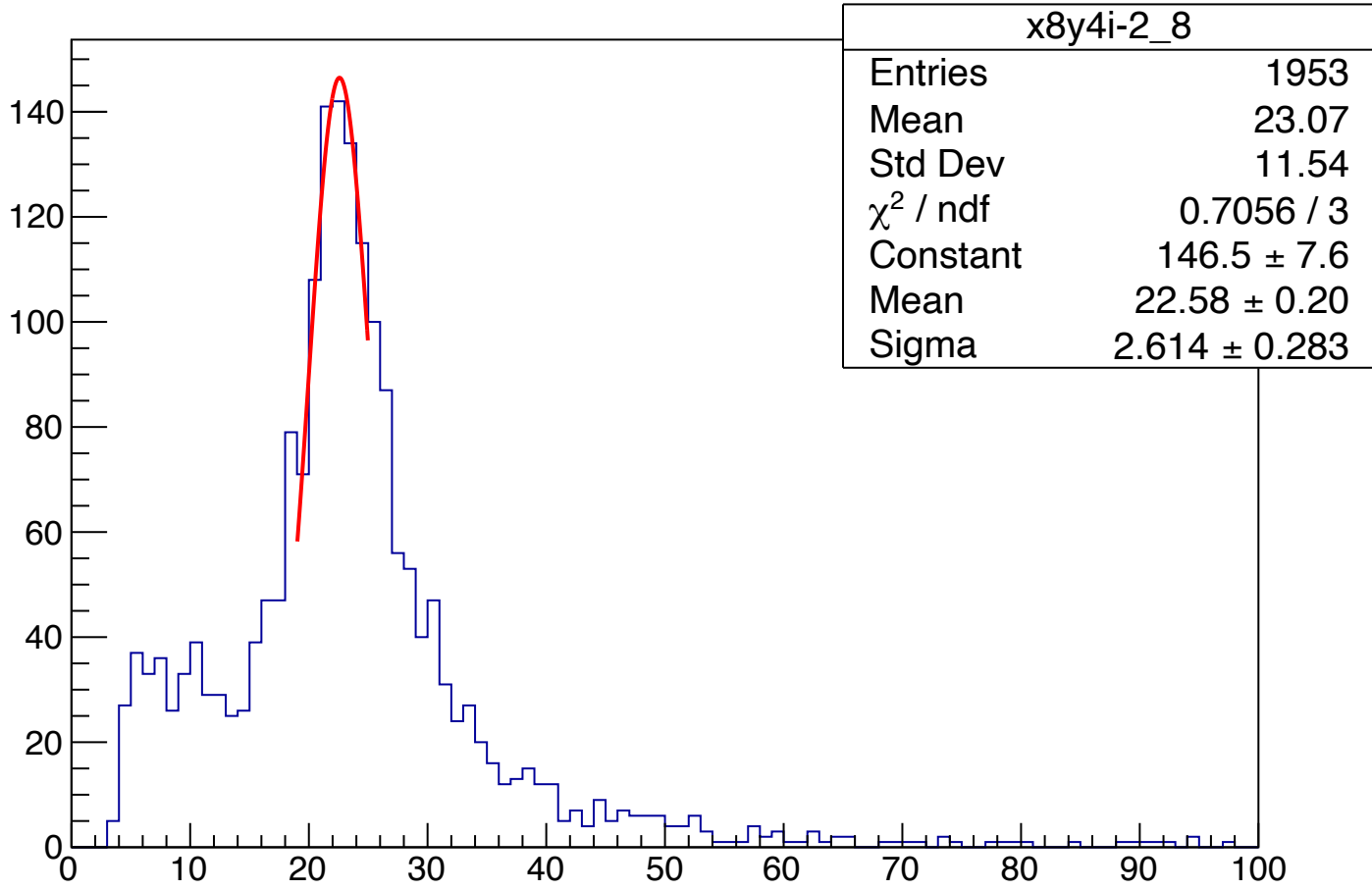
Step: 25 um

Reproduce on C75: Right pad

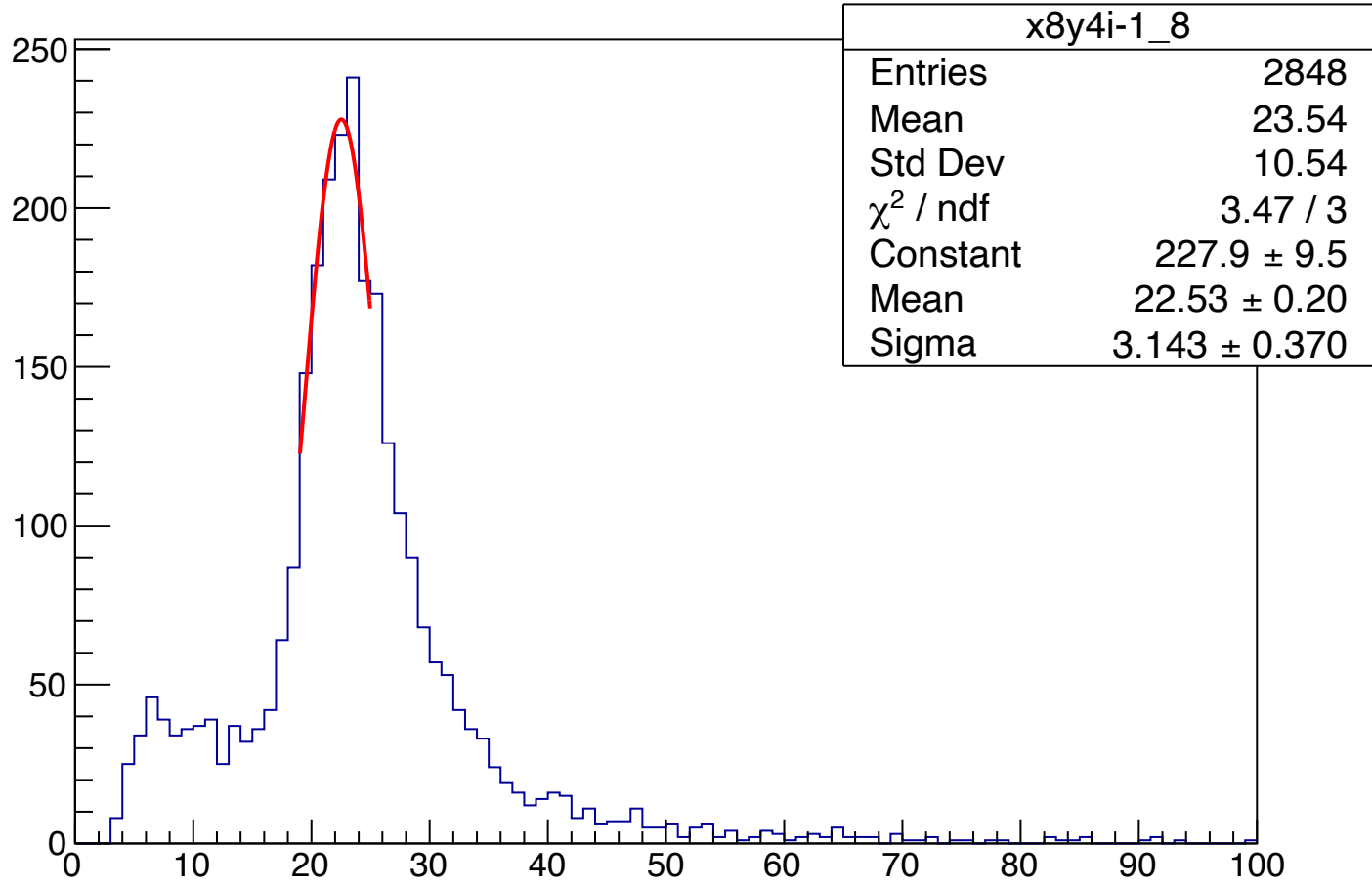
X Scan Stripe (7.99, 4) Right pad



X Scan Stripe (7.99, 4) Right pad



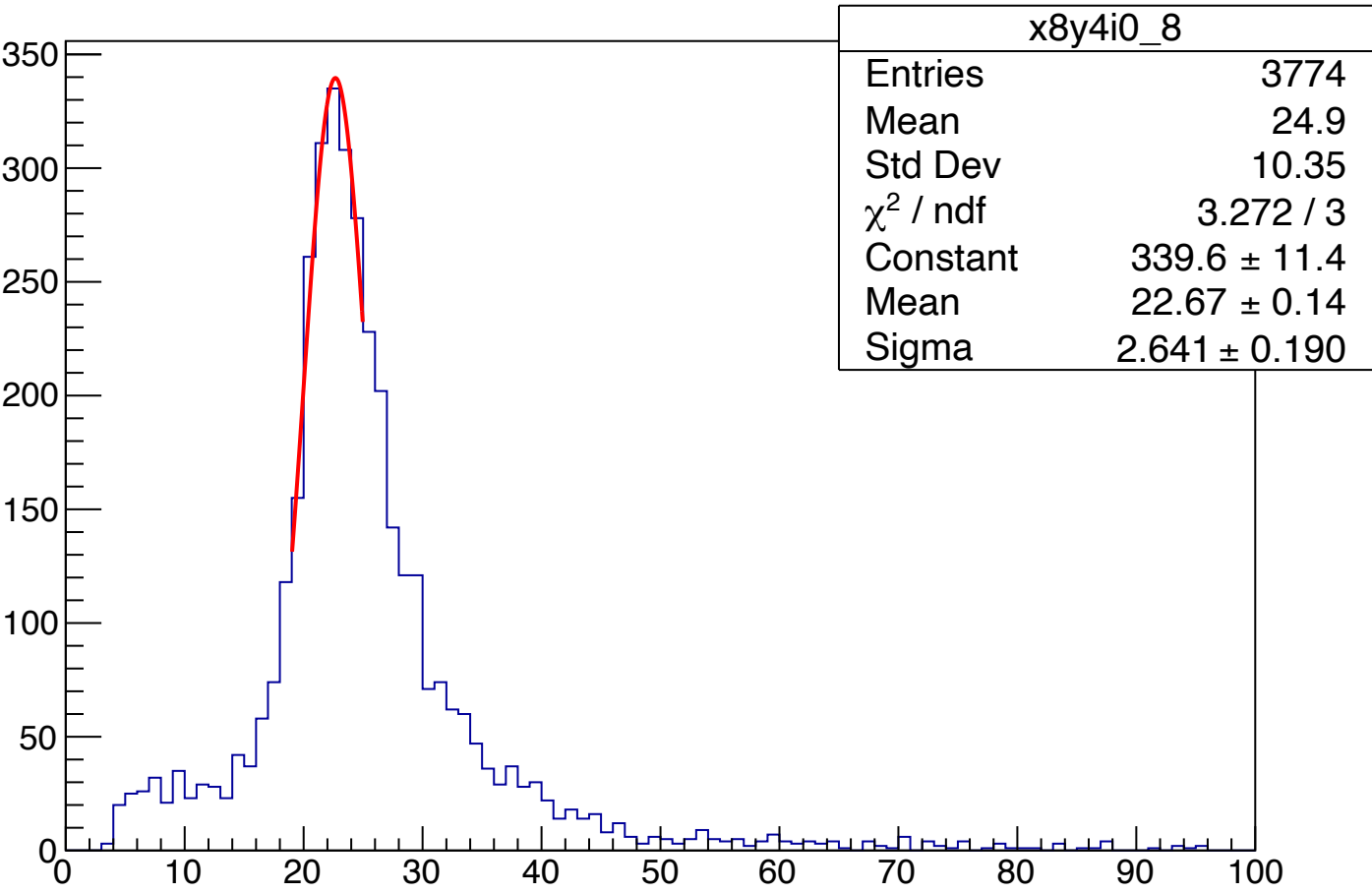
X Scan Stripe (8.00, 4) Right pad



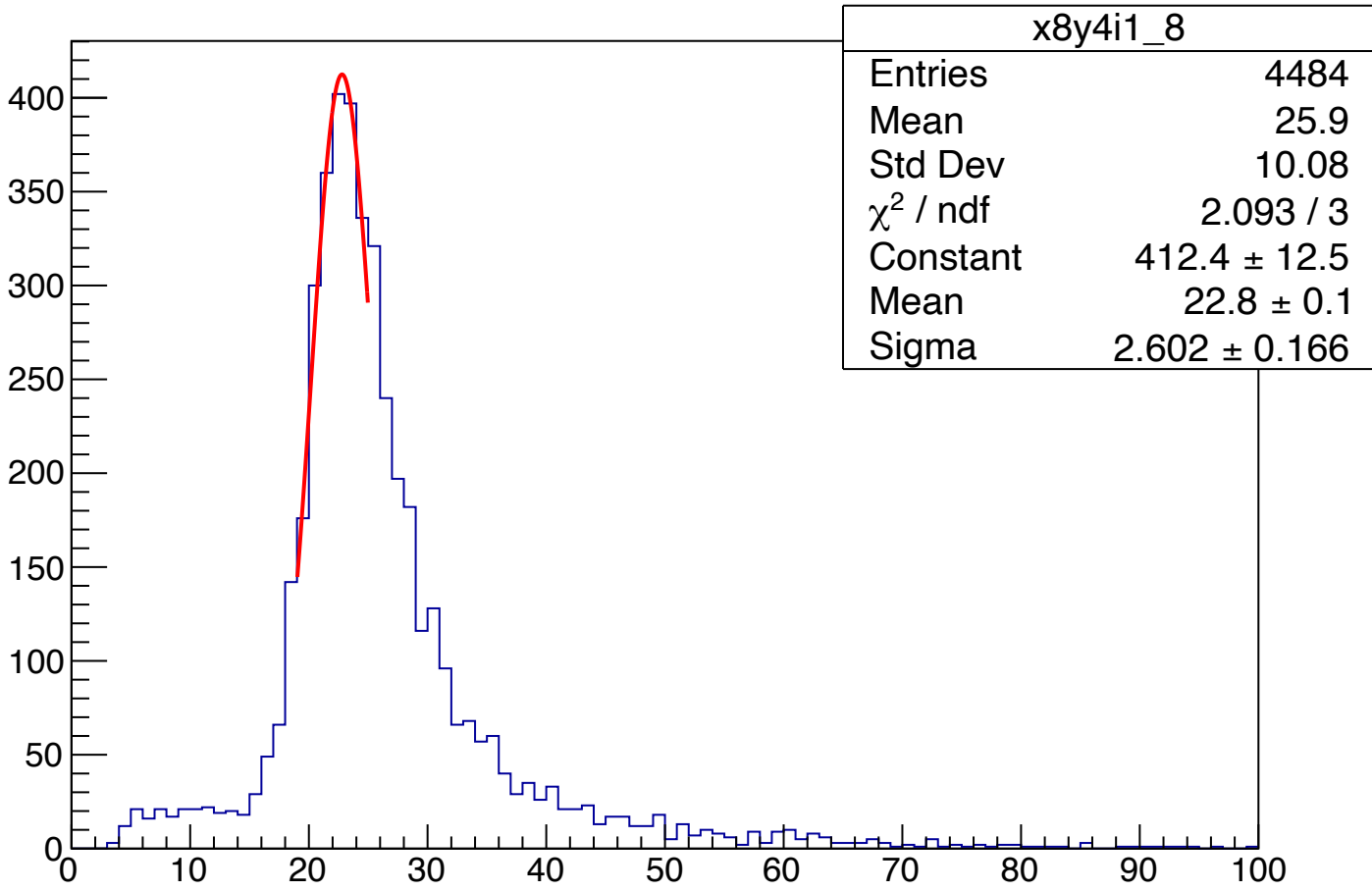
Pad (7,4)

Boundary

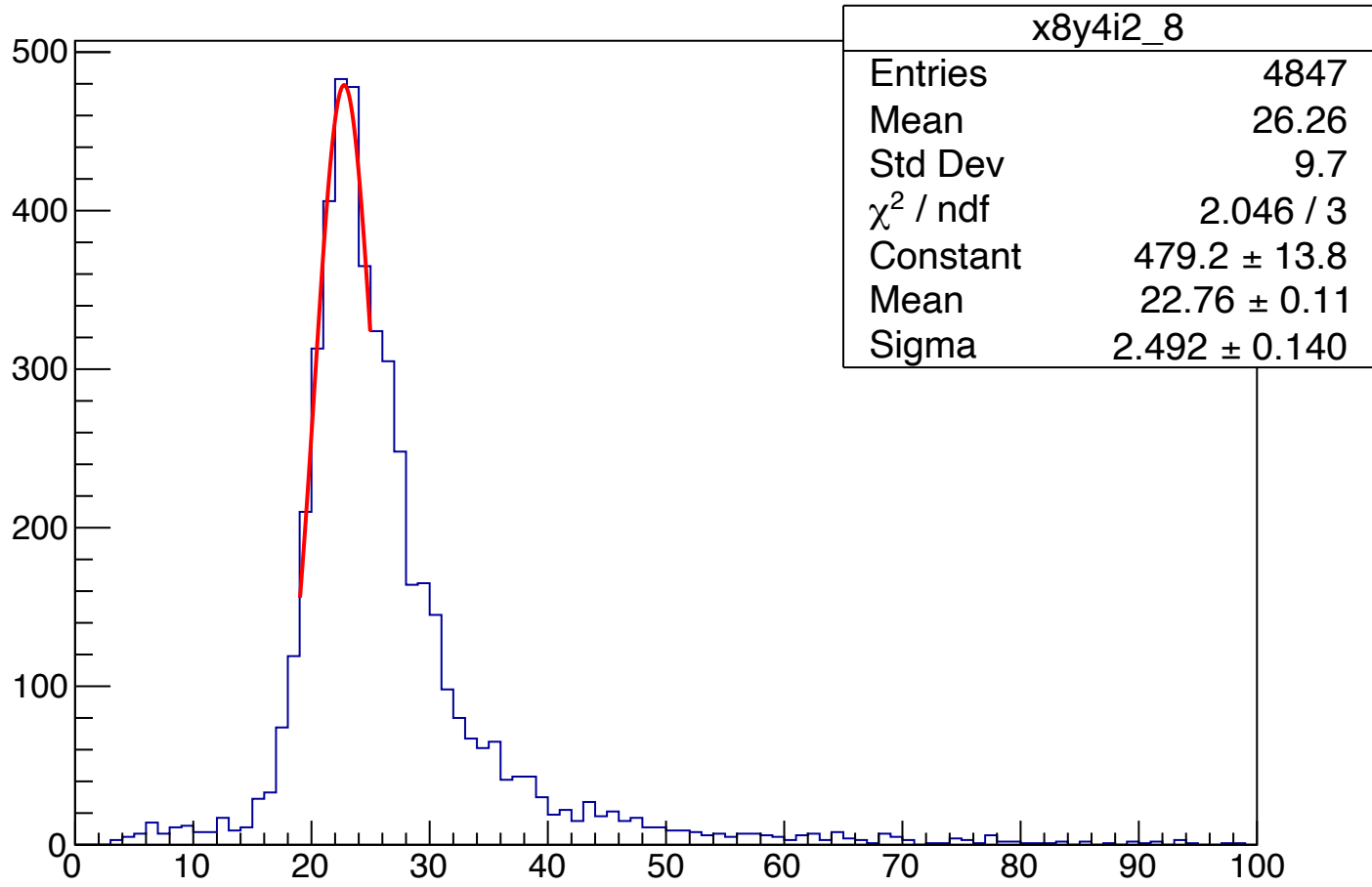
X Scan Stripe (8.00, 4) Right pad



X Scan Stripe (8.00, 4) Right pad



X Scan Stripe (8.01, 4) Right pad



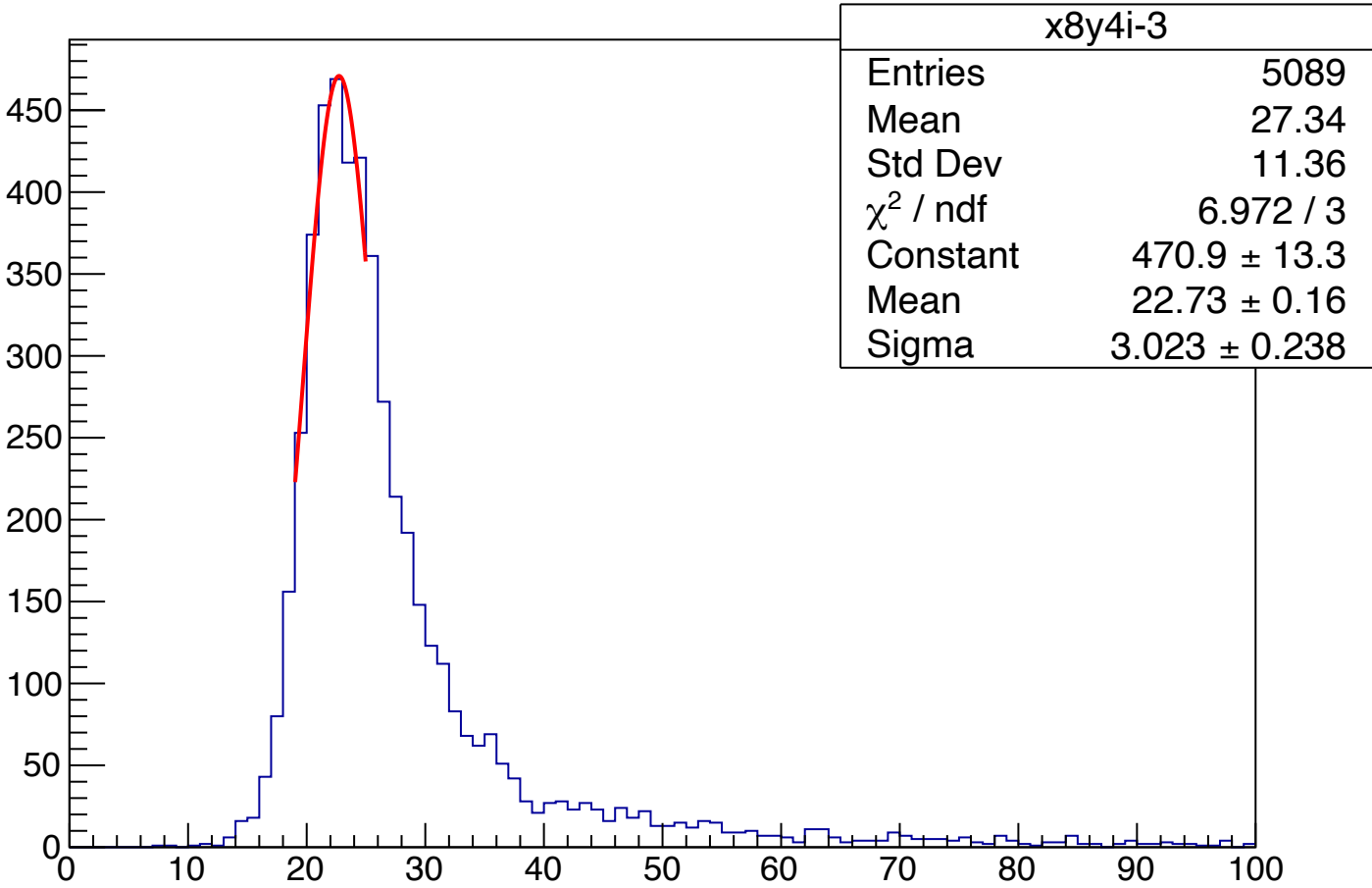
Boundary

Pad (8,4)

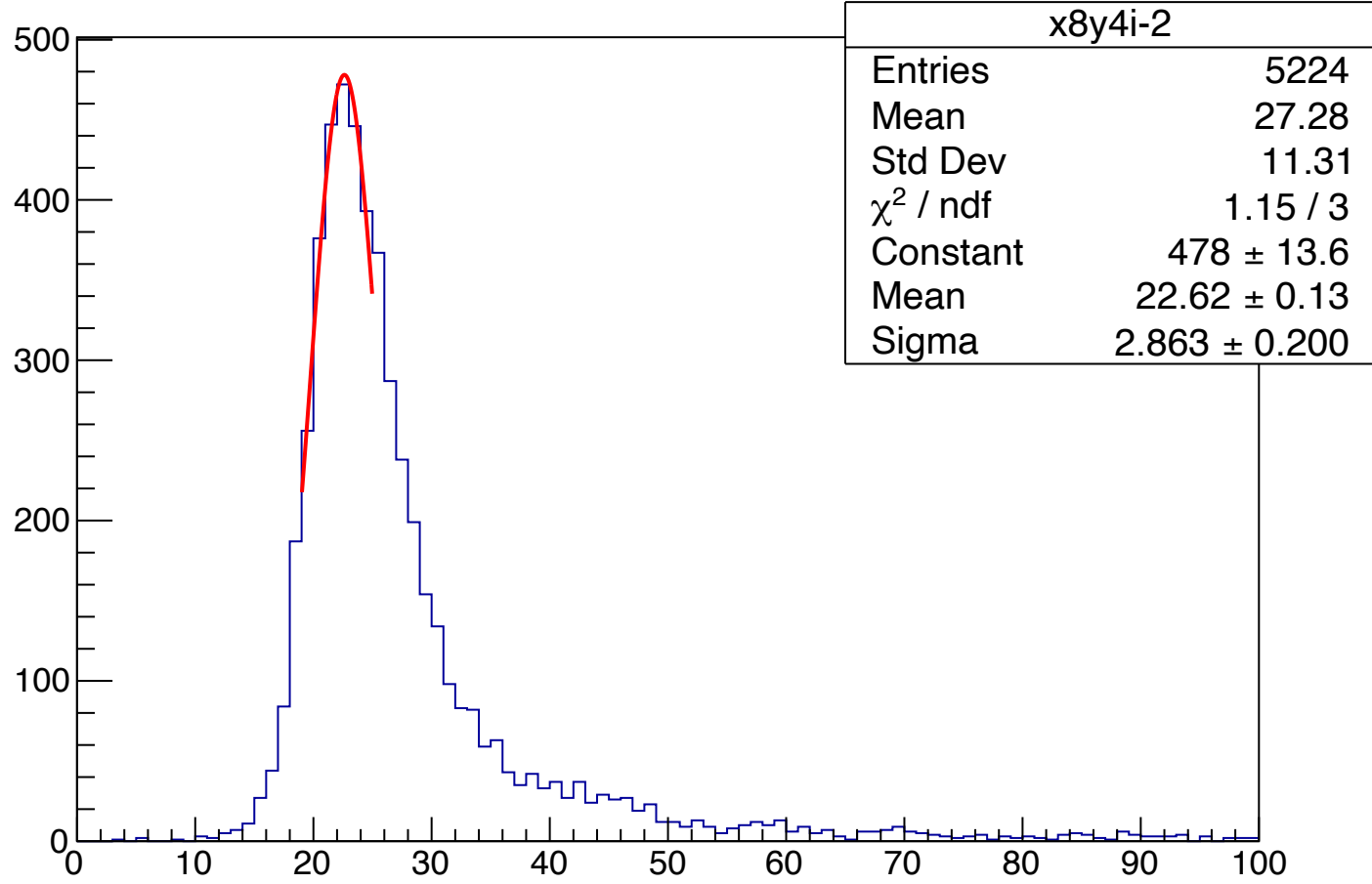
Step: 25 um

Reproduce on C75: Sum of two pads

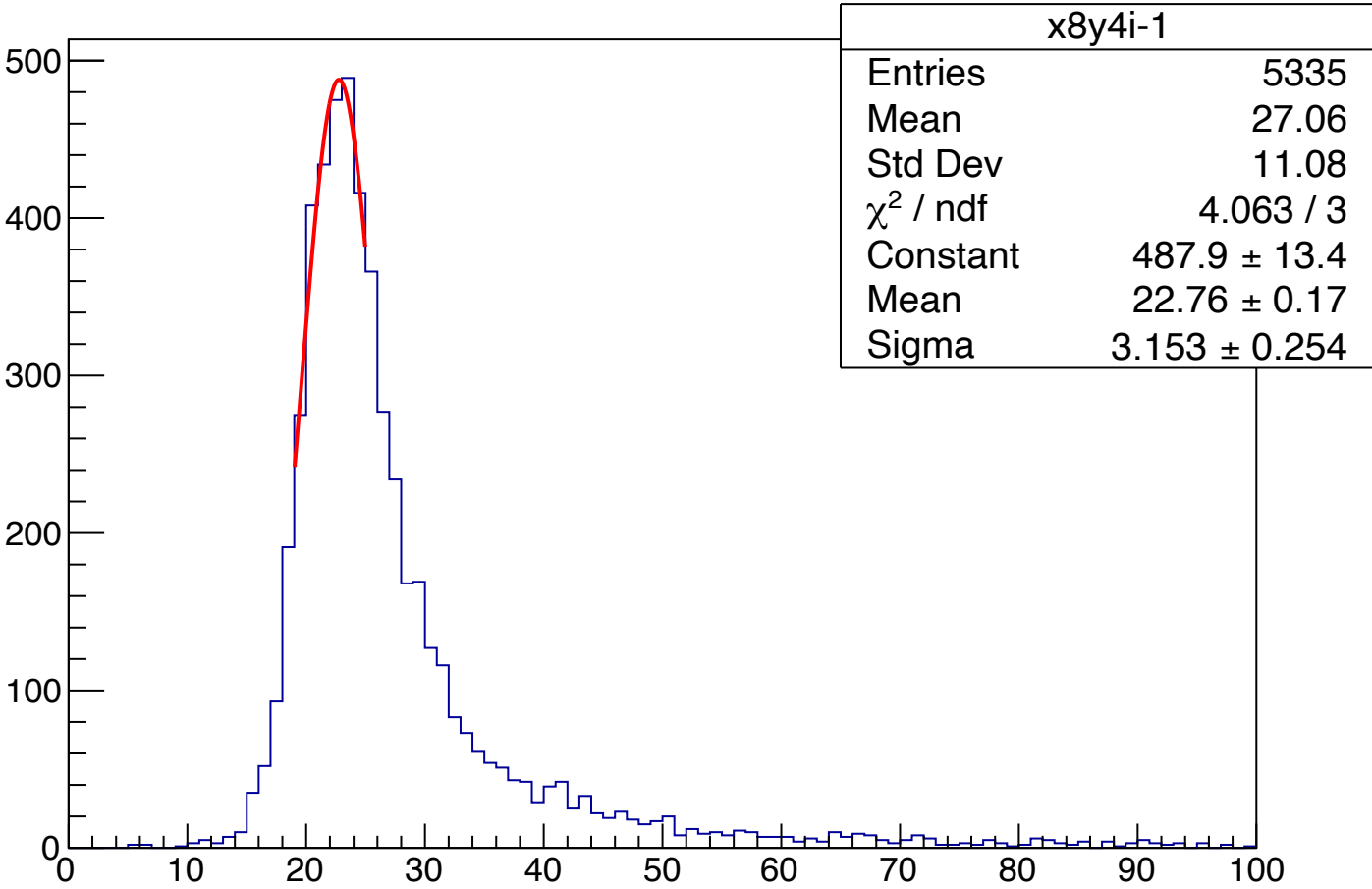
X Scan Stripe (7.99, 4) Sum of pads



X Scan Stripe (7.99, 4) Sum of pads



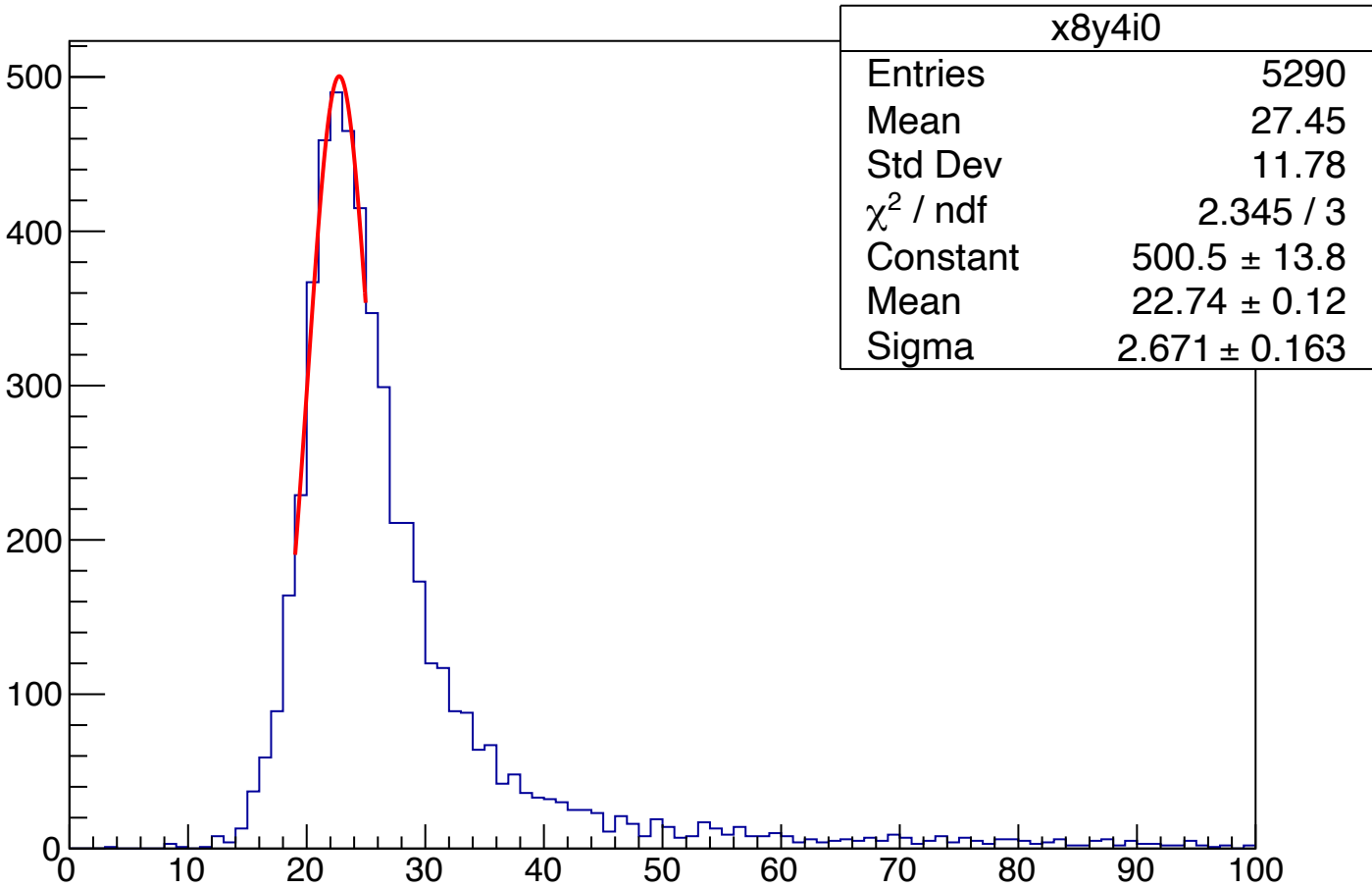
X Scan Stripe (8.00, 4) Sum of pads



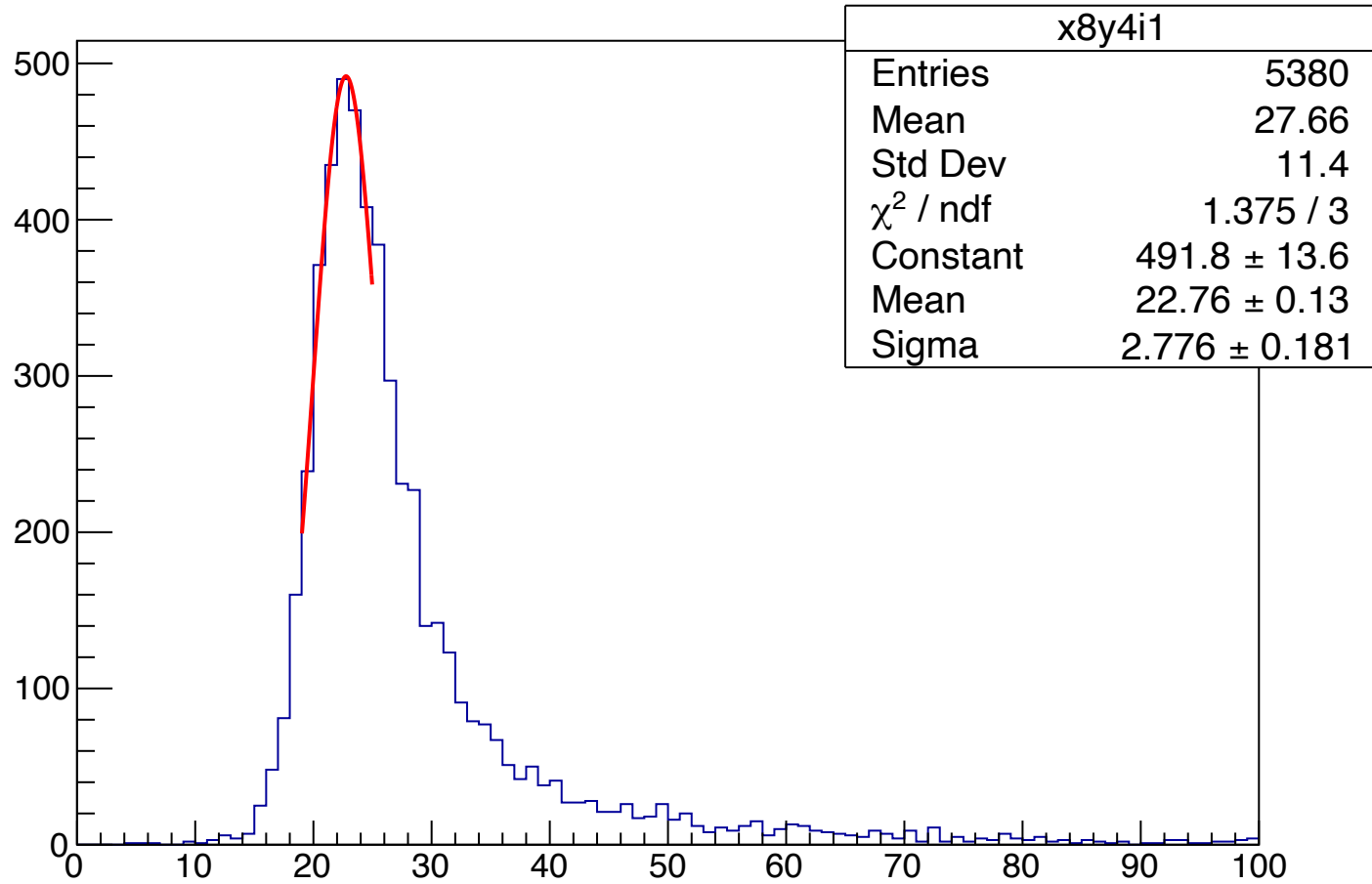
Pad (7,4)

Boundary

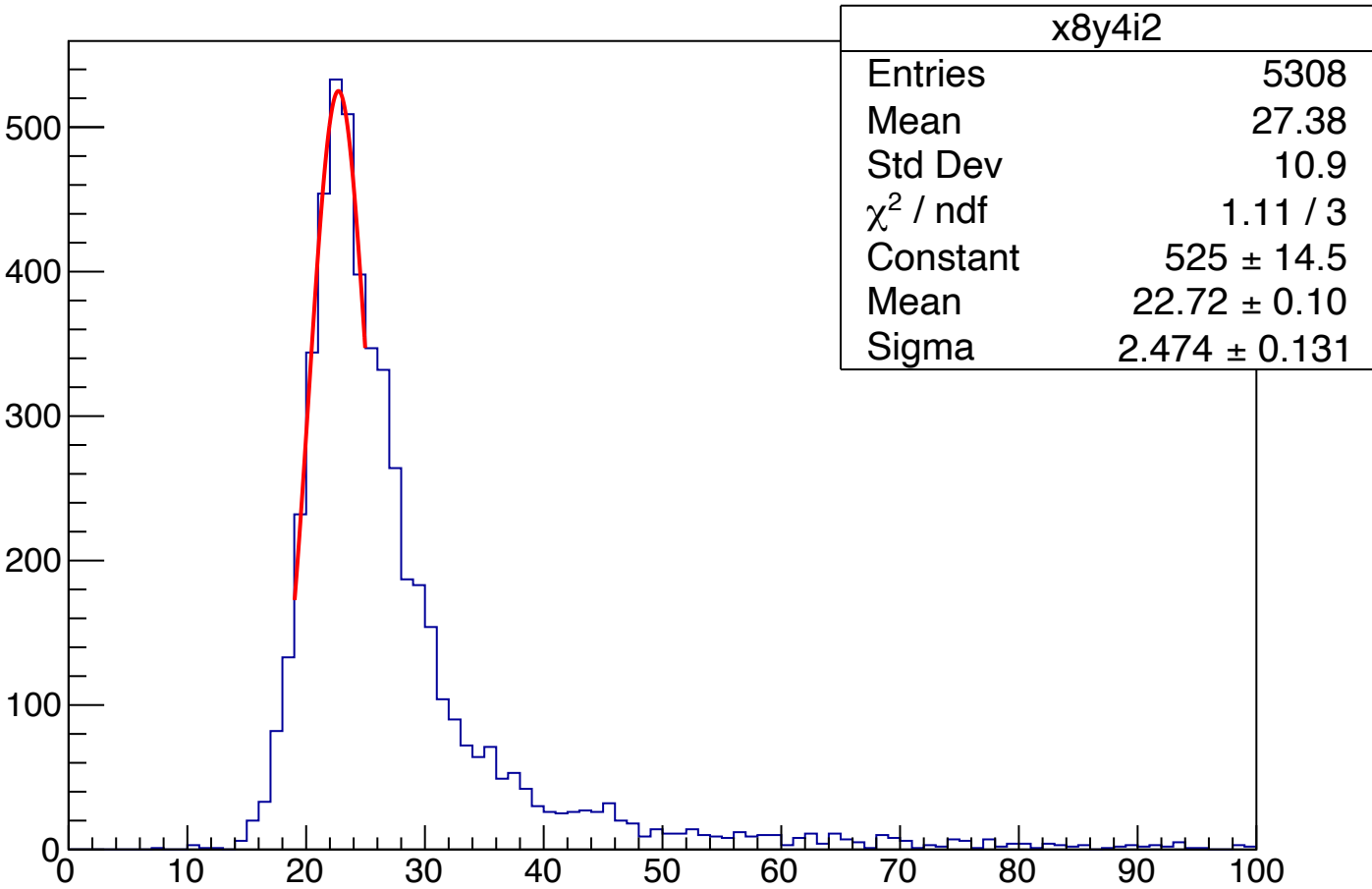
X Scan Stripe (8.00, 4) Sum of pads



X Scan Stripe (8.00, 4) Sum of pads



X Scan Stripe (8.01, 4) Sum of pads



Boundary

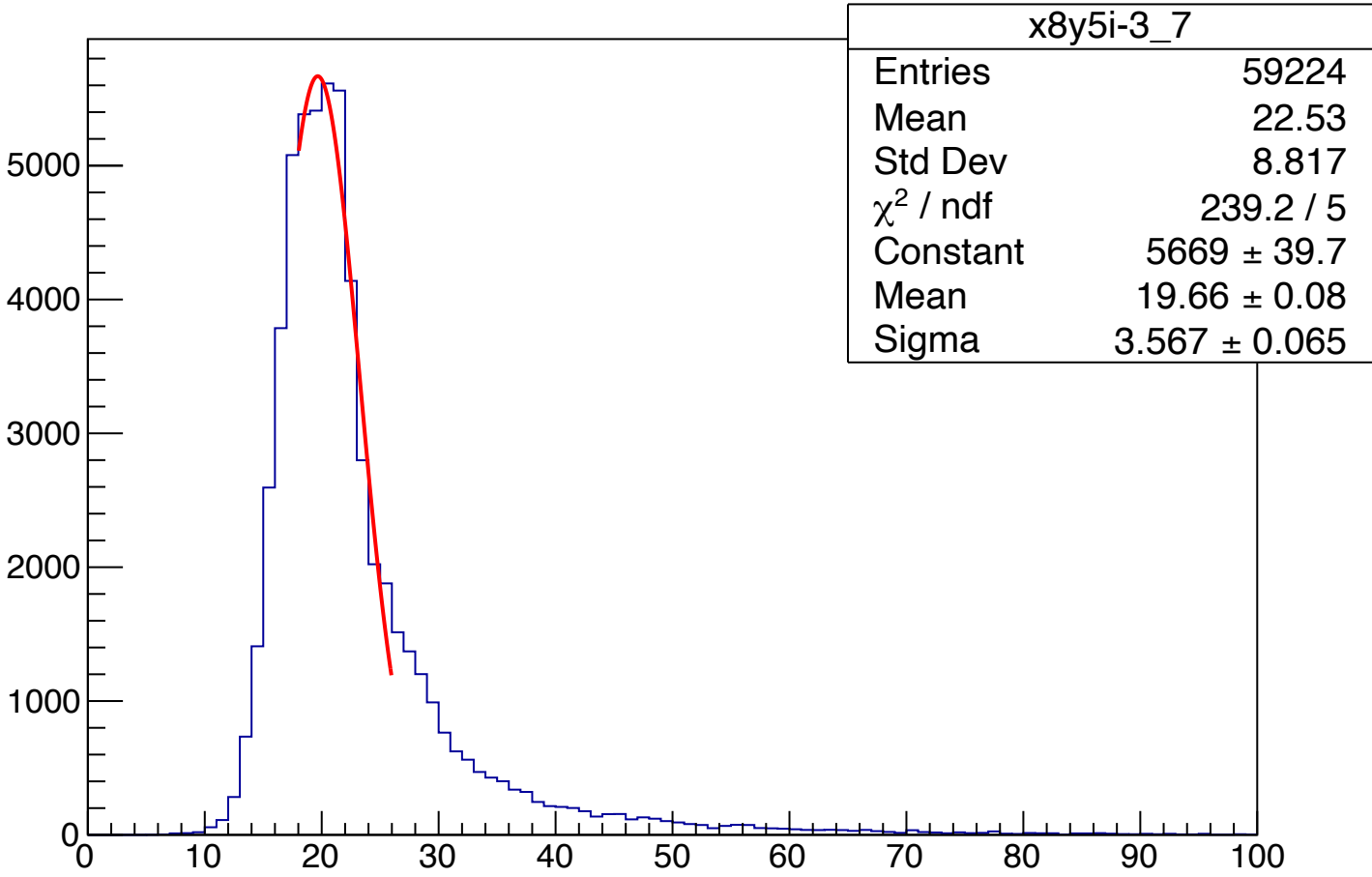
Pad (8,4)

- With 25 um stripe, the “shoulder” is more visible
- Next three slides are the same scan method with GaAs Yan 1 sensor, gap size 300 um

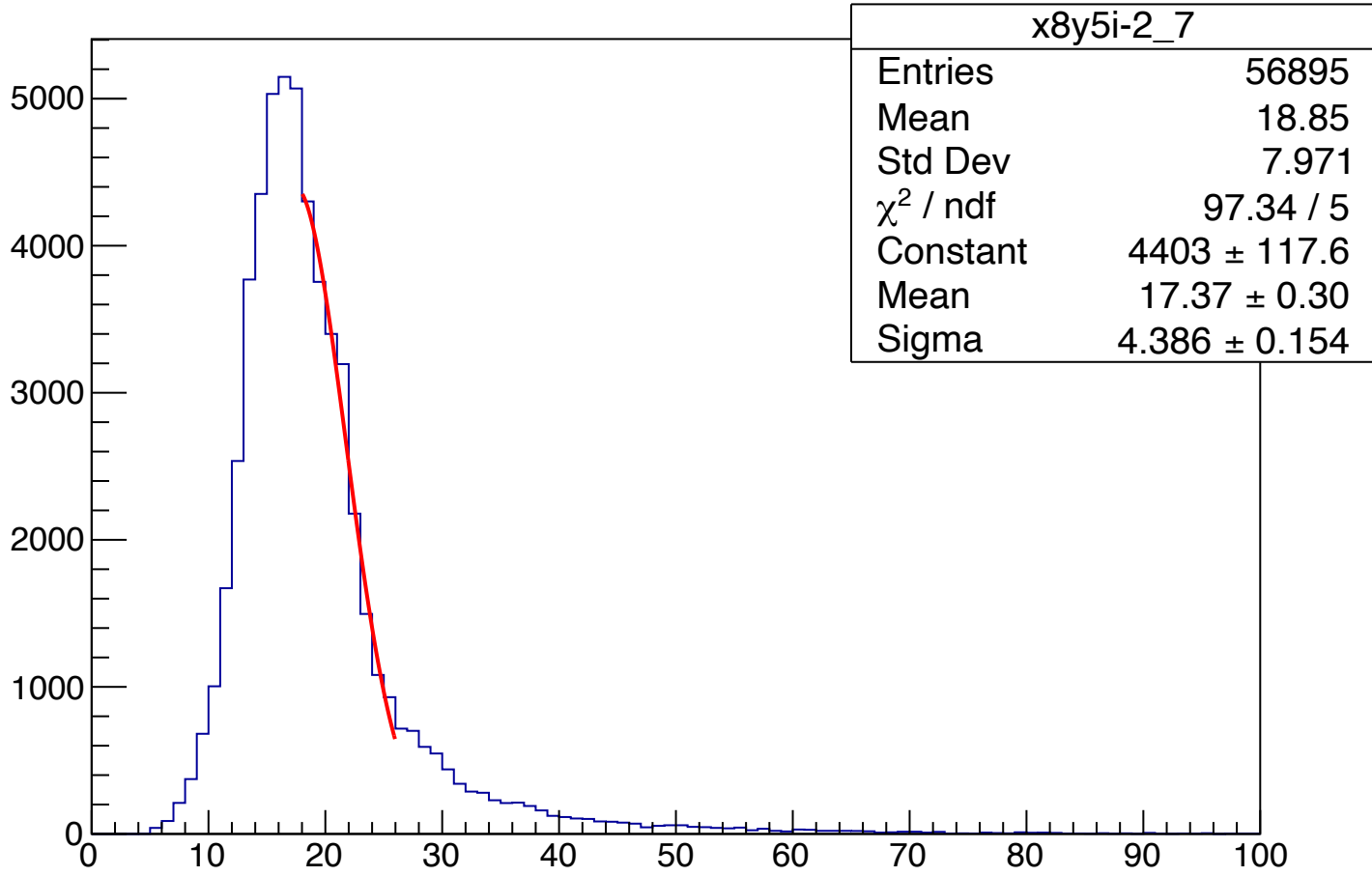
Step: 125 um

Reproduce on Y1: Left pad

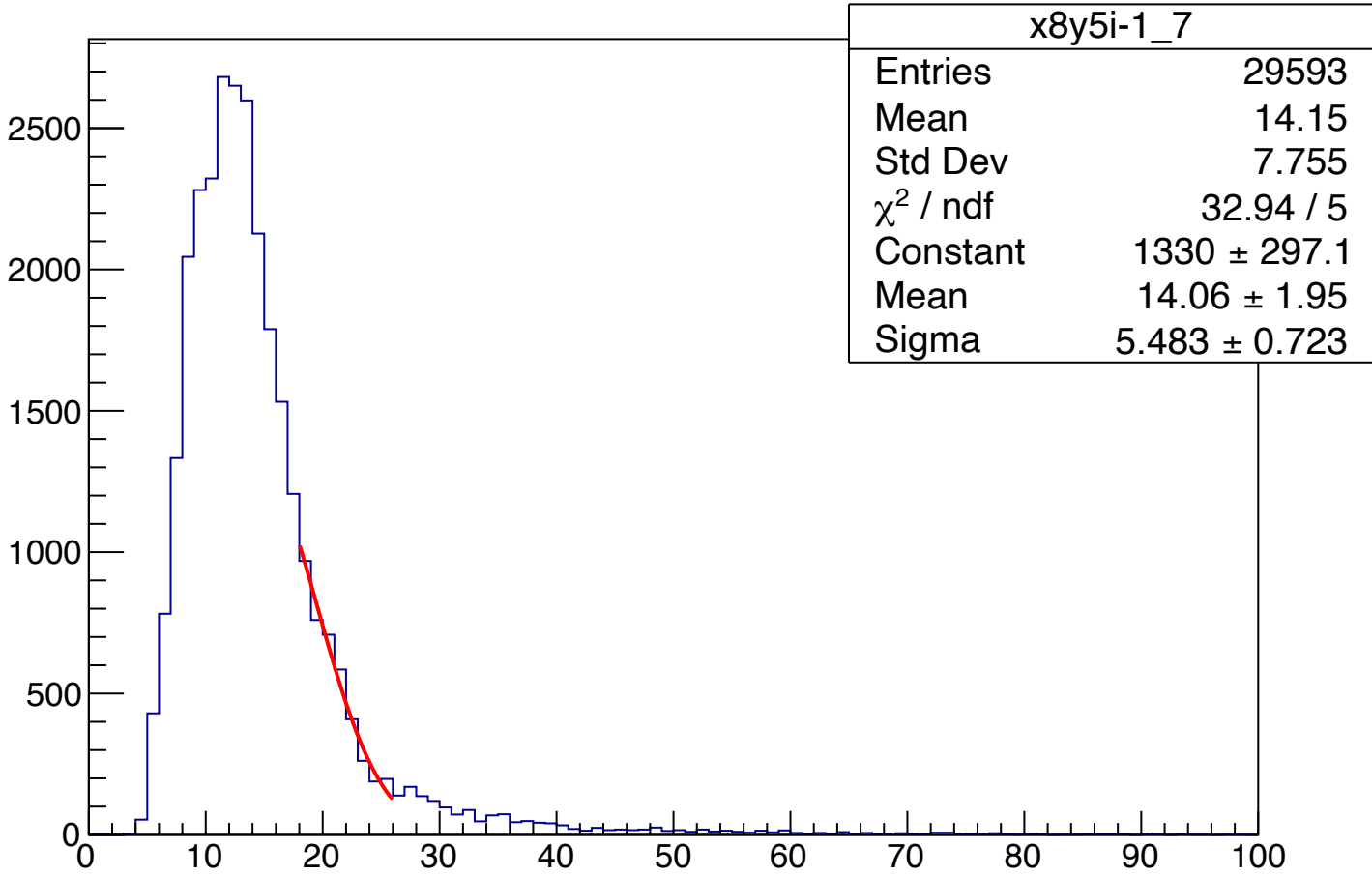
X Scan Stripe (7.92, 5) Left pad



X Scan Stripe (7.95, 5) Left pad



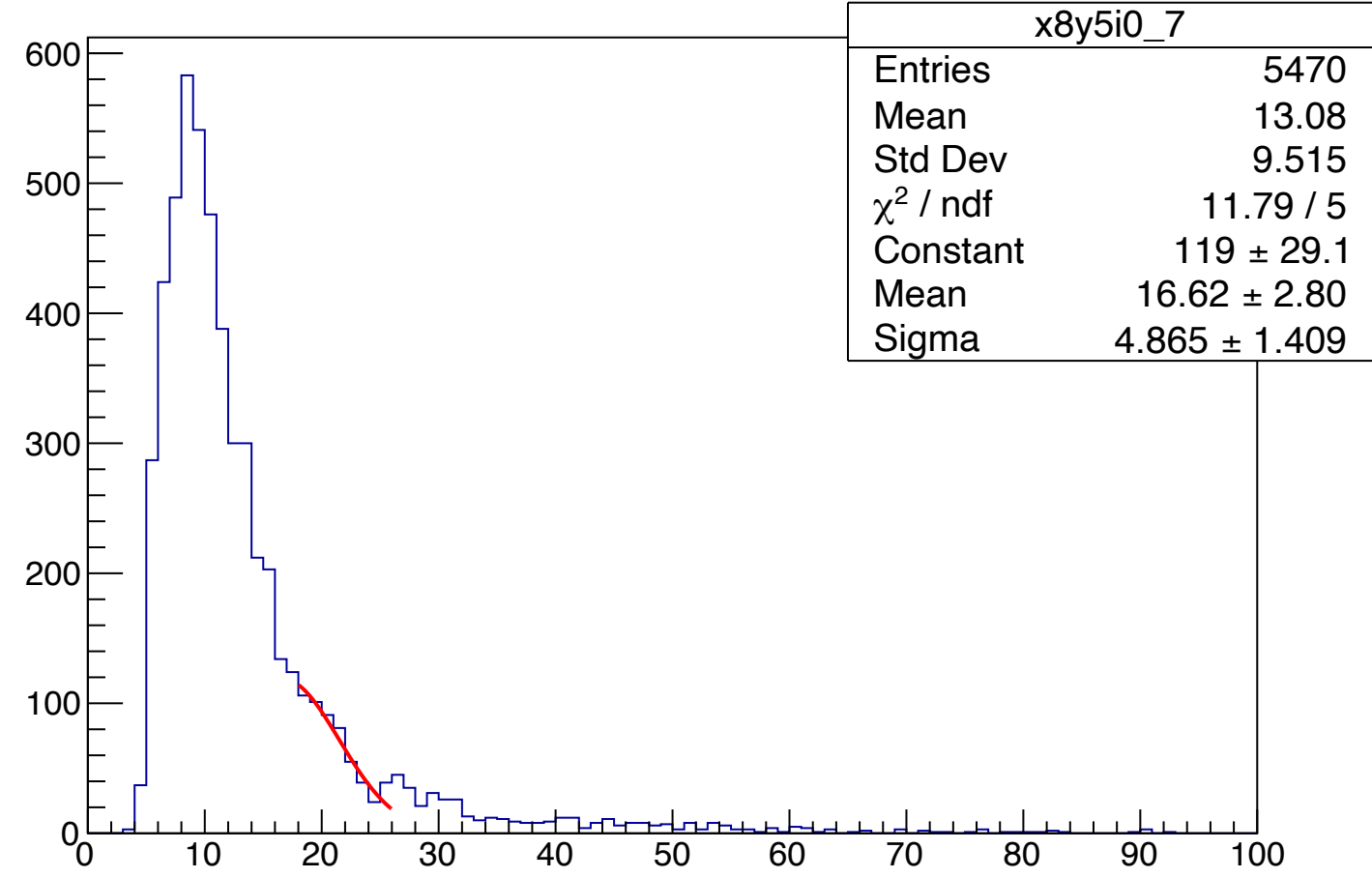
X Scan Stripe (7.97, 5) Left pad



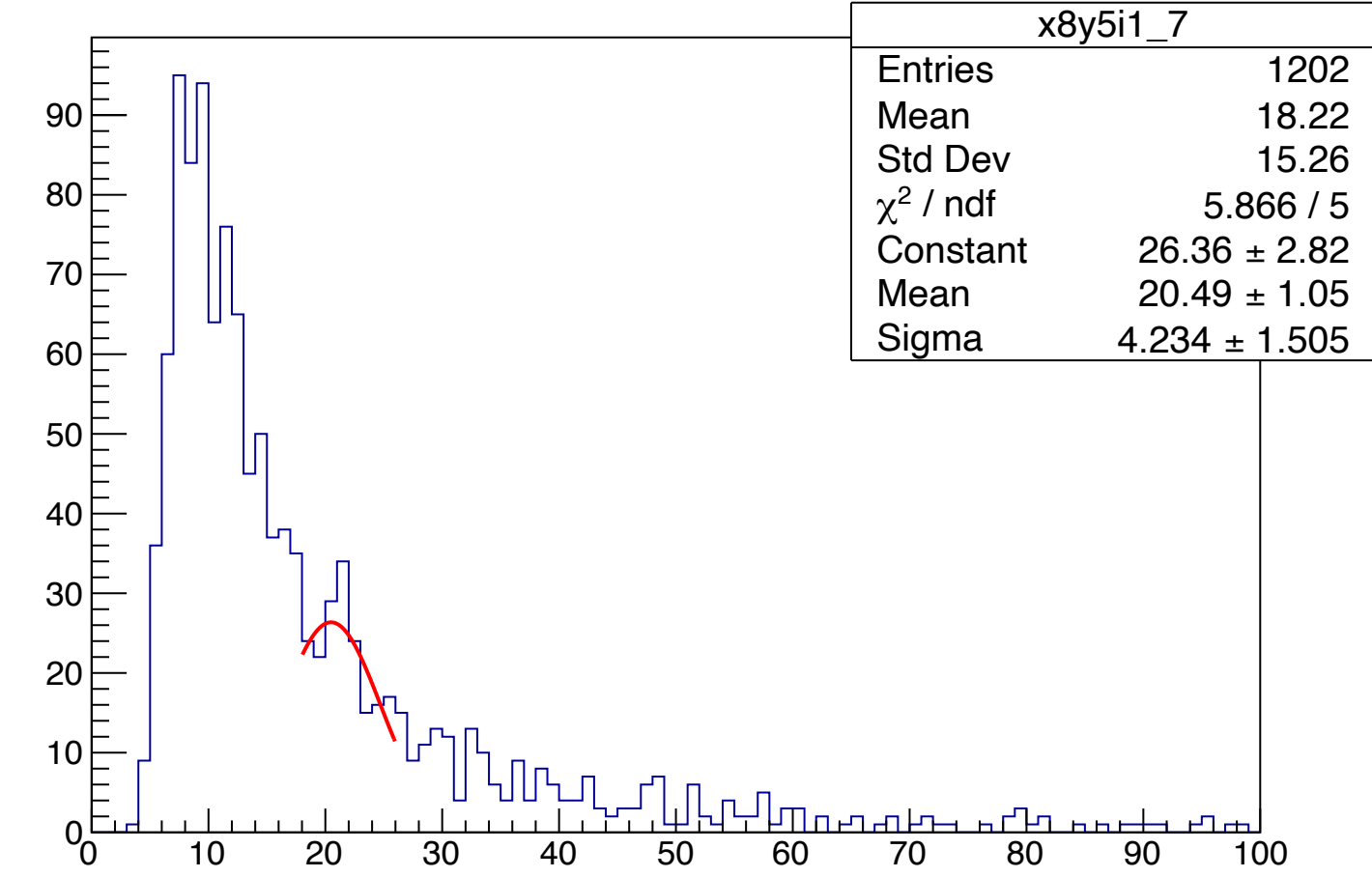
Pad (7,5)

Boundary

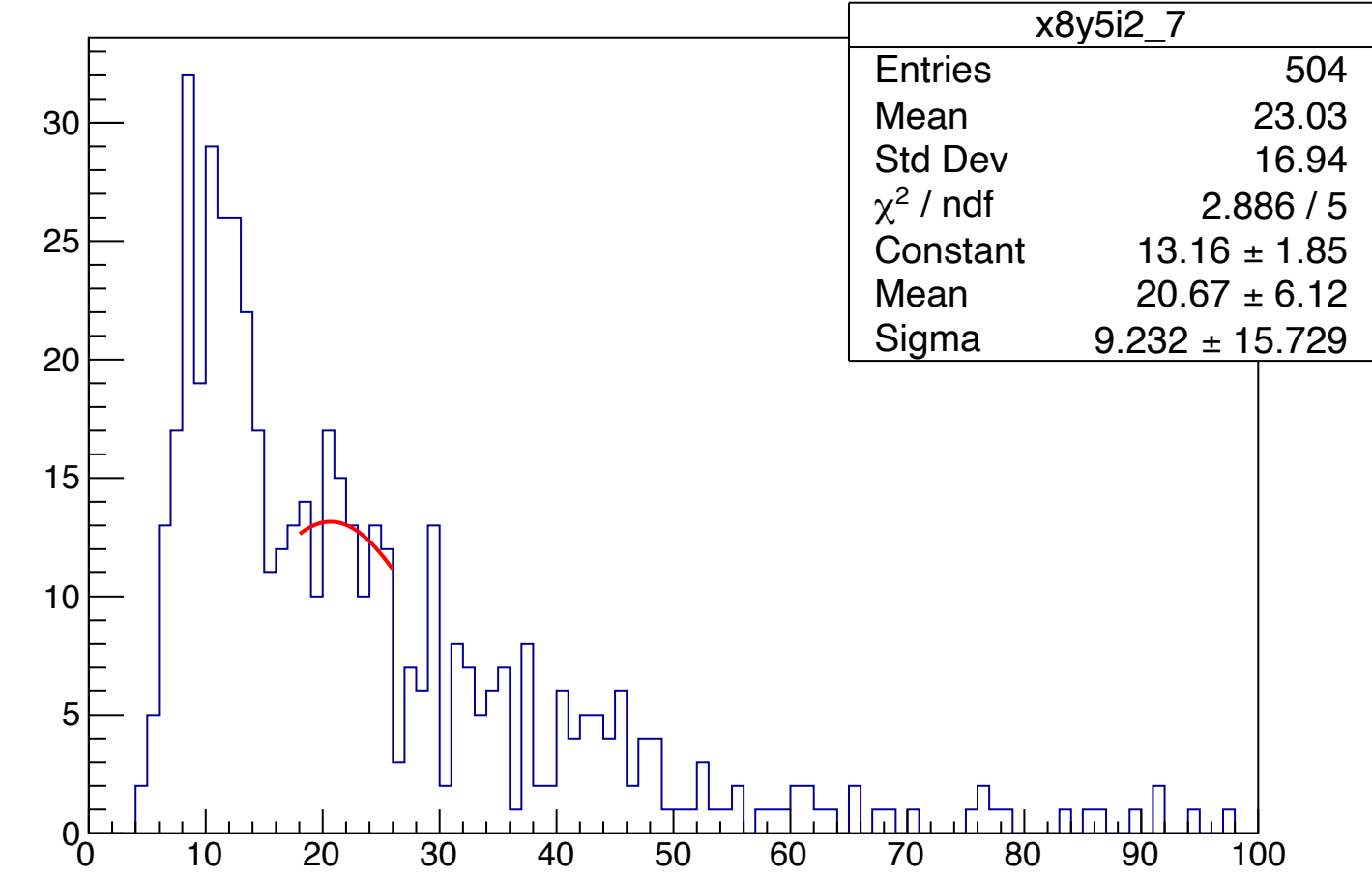
X Scan Stripe (8.00, 5) Left pad



X Scan Stripe (8.03, 5) Left pad



X Scan Stripe (8.05, 5) Left pad



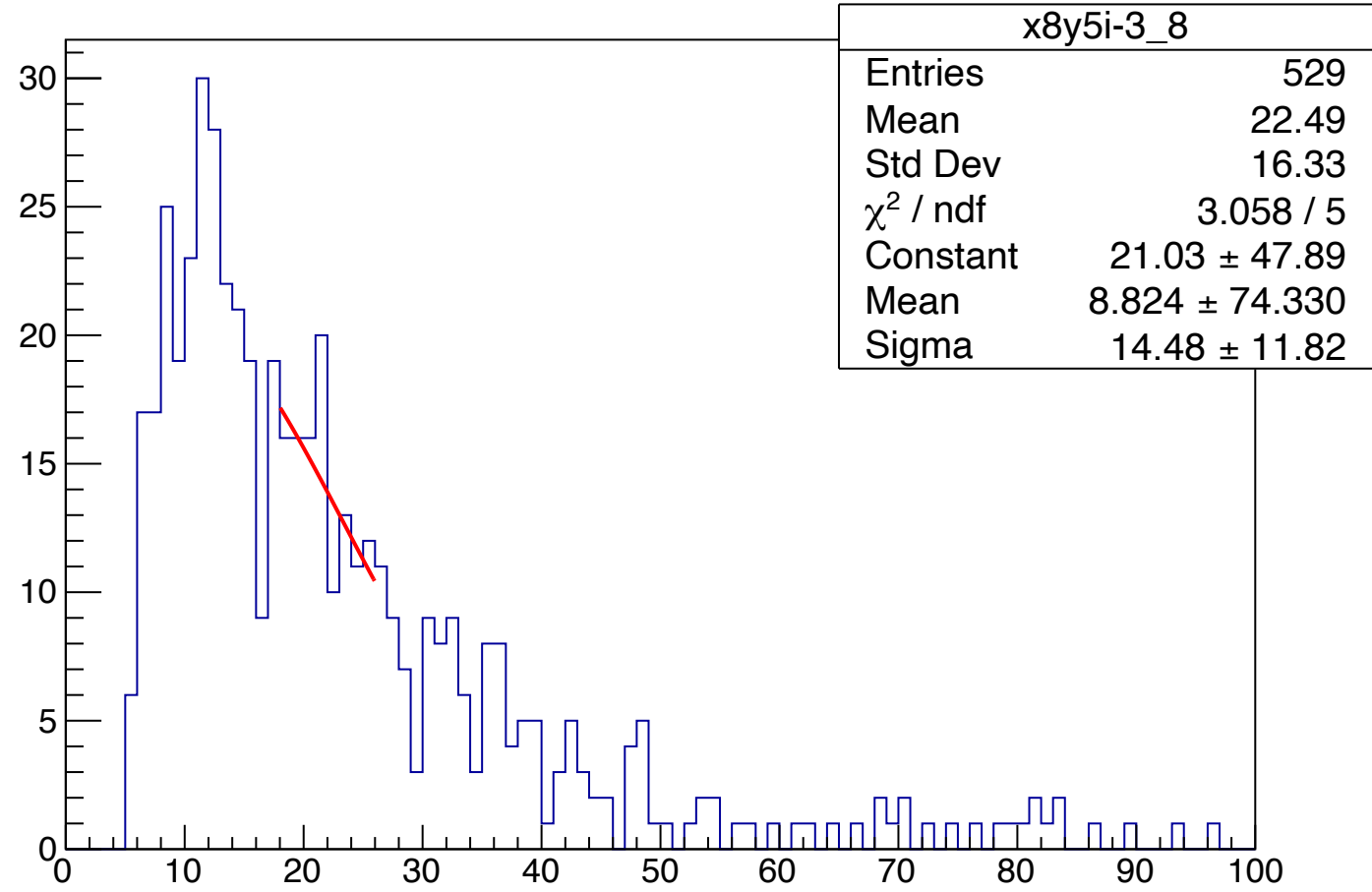
Boundary

Pad (8,5)

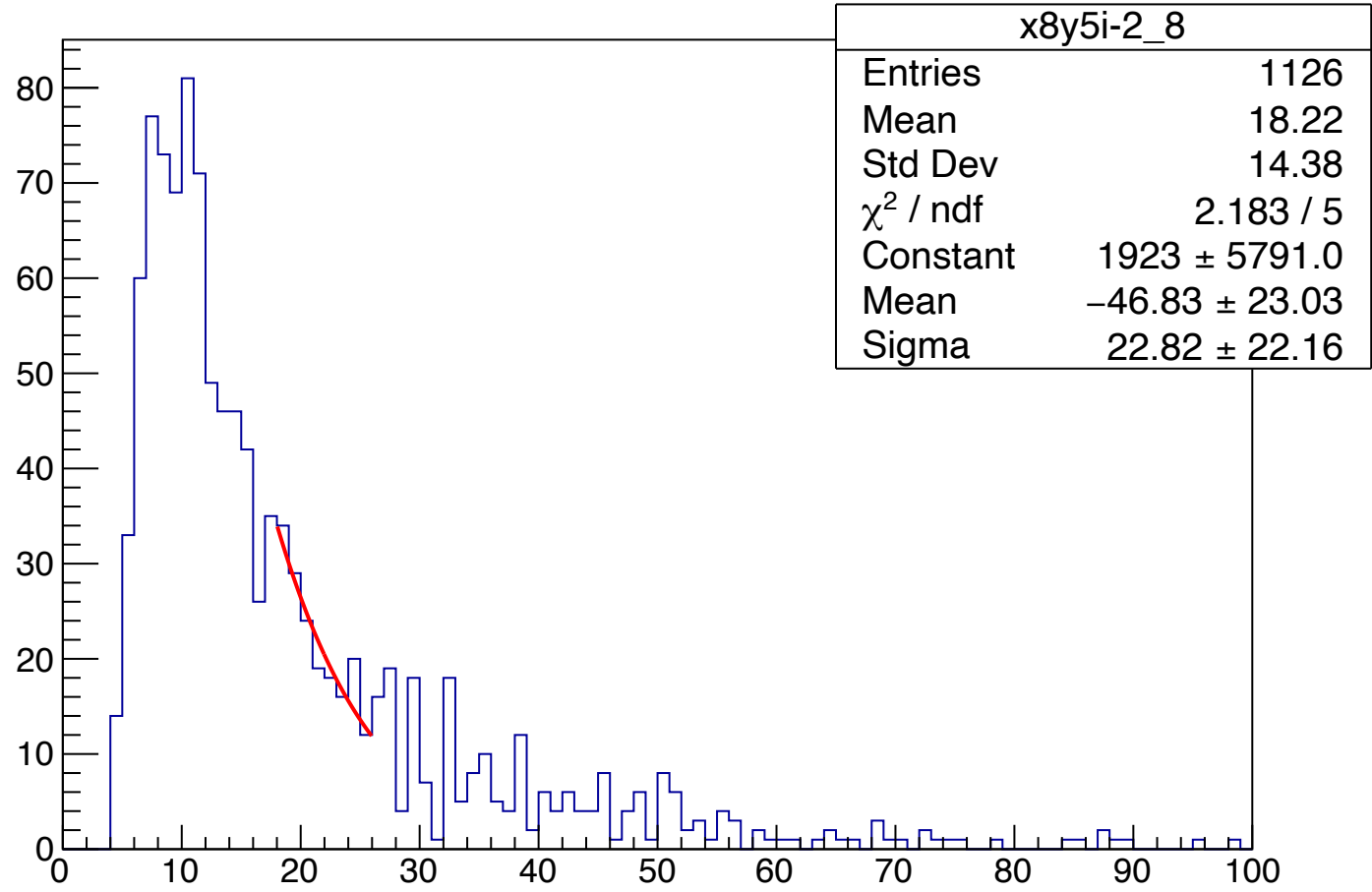
Step: 125 um

Reproduce on Y1: Right pad

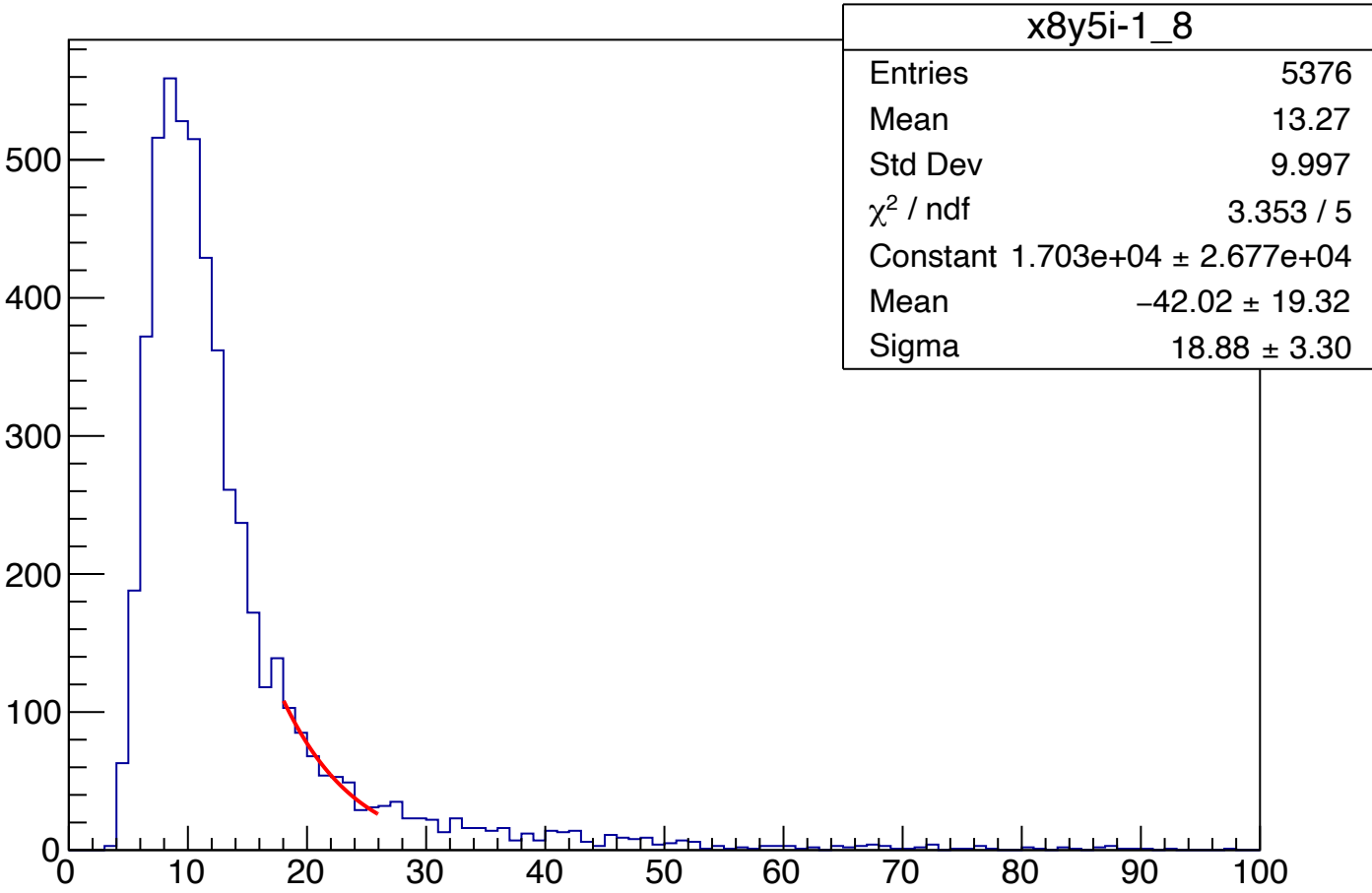
X Scan Stripe (7.92, 5) Right pad



X Scan Stripe (7.95, 5) Right pad



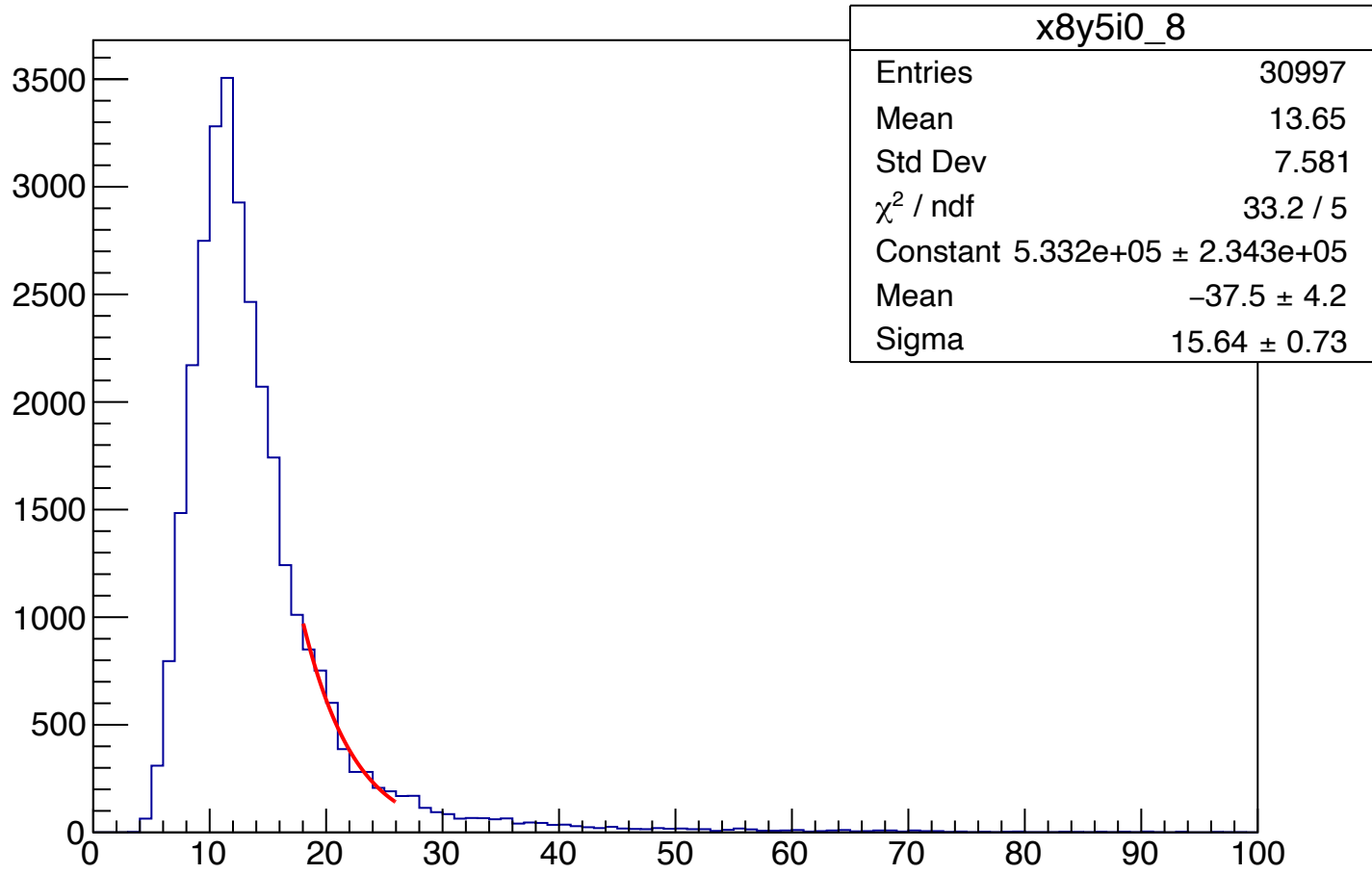
X Scan Stripe (7.97, 5) Right pad



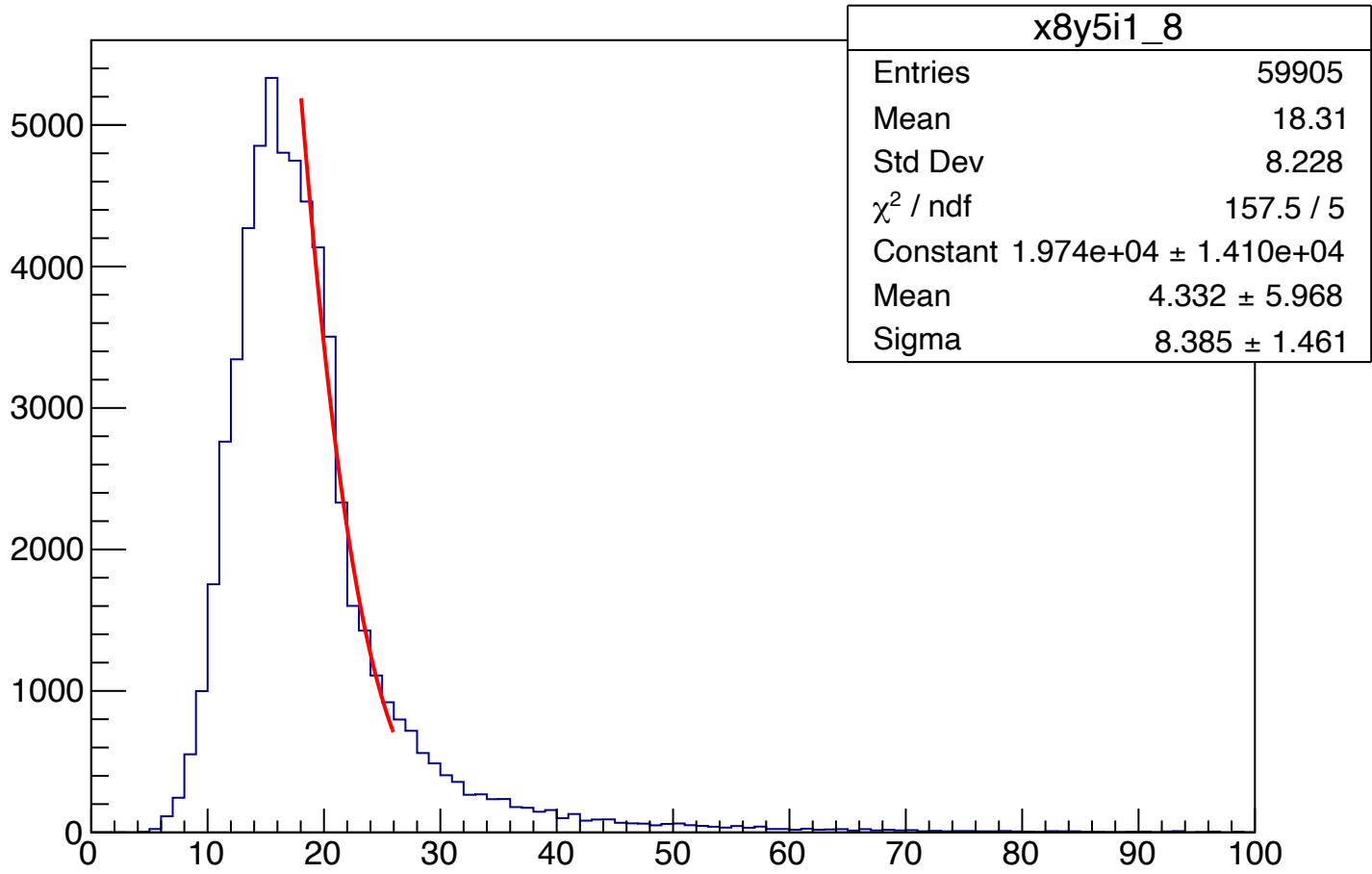
Pad (7,5)

Boundary

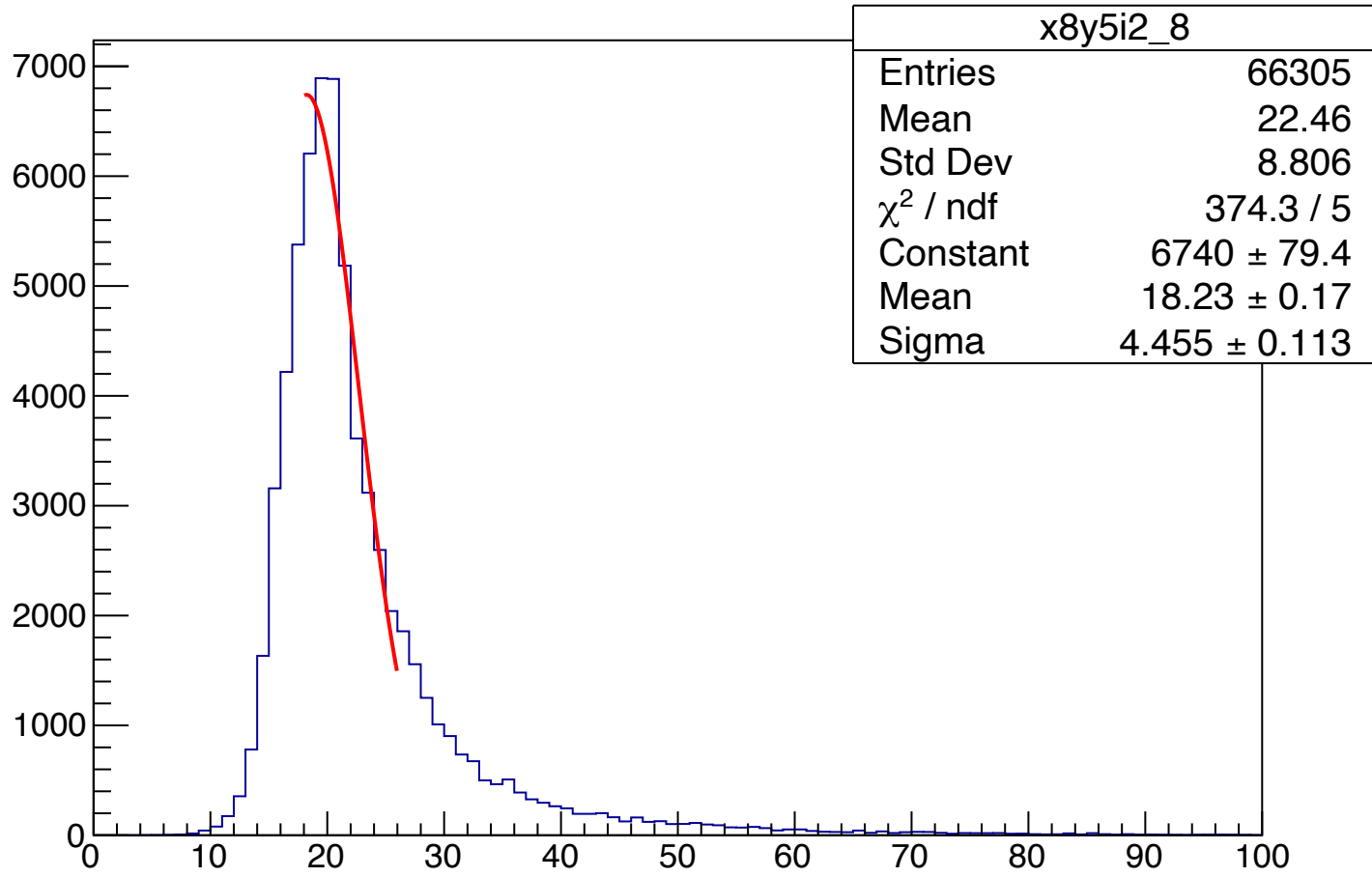
X Scan Stripe (8.00, 5) Right pad



X Scan Stripe (8.03, 5) Right pad



X Scan Stripe (8.05, 5) Right pad



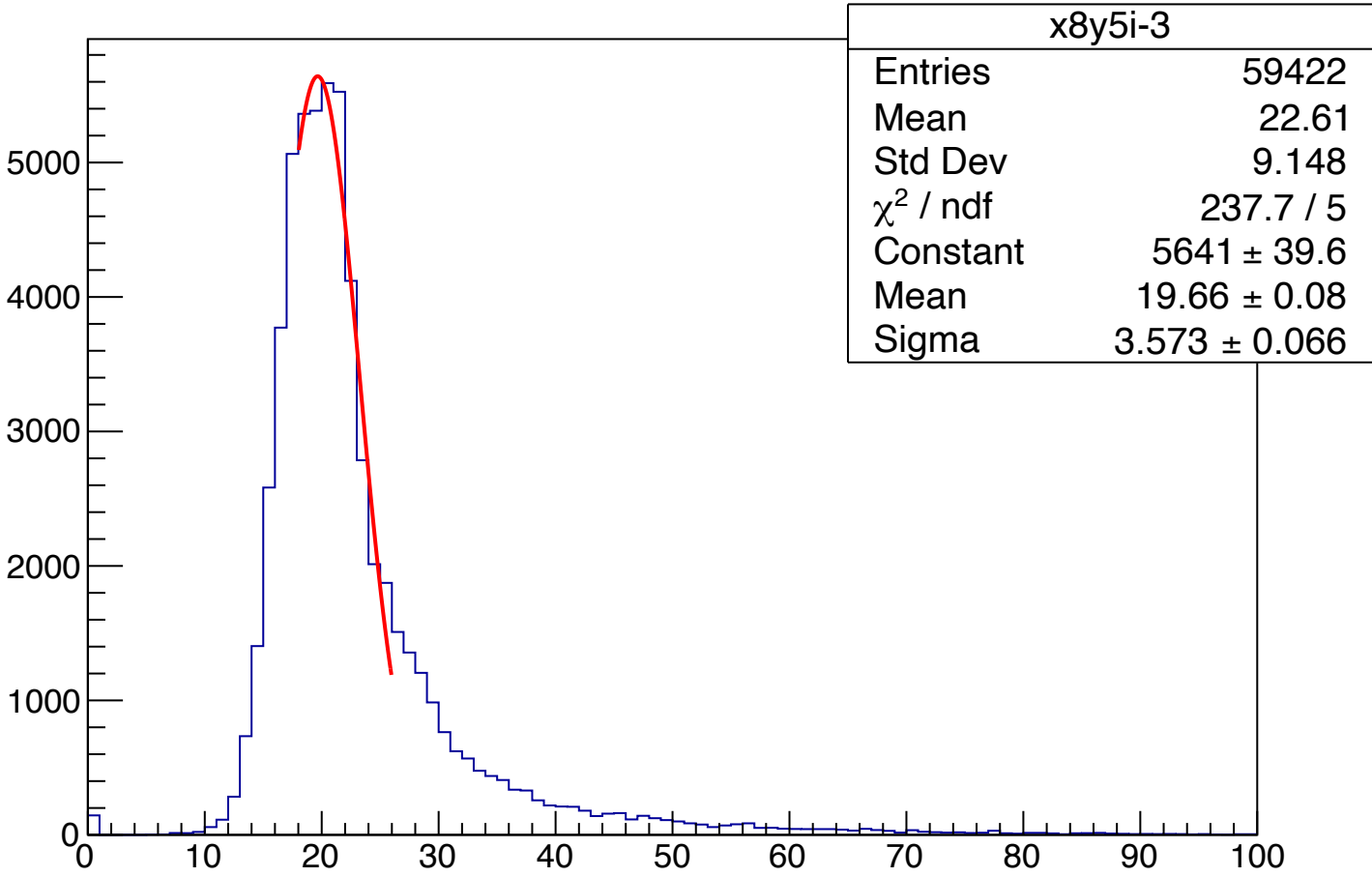
Boundary

Pad (8,5)

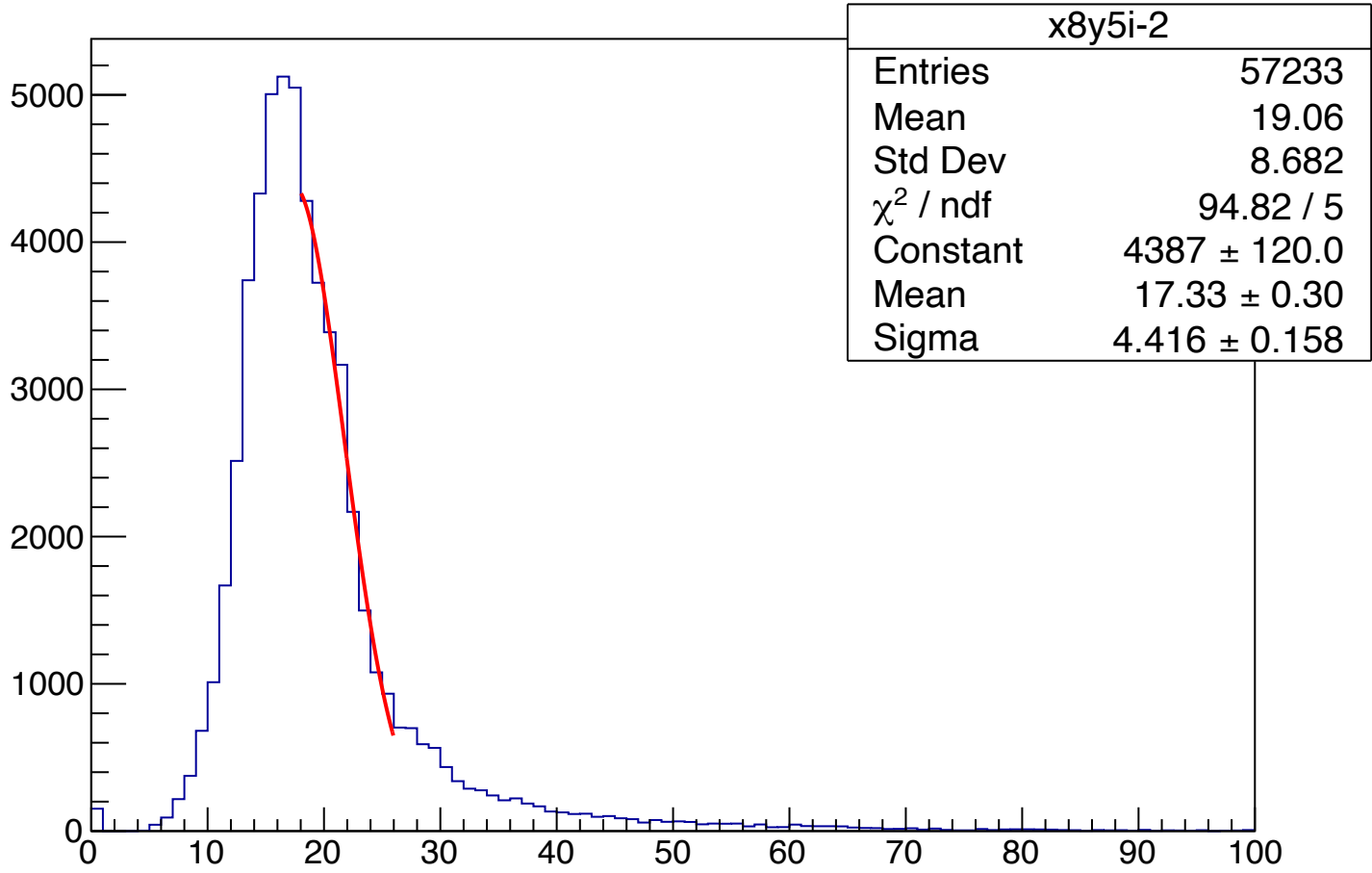
Step: 125 um

Reproduce on Y1: Sum of two pads

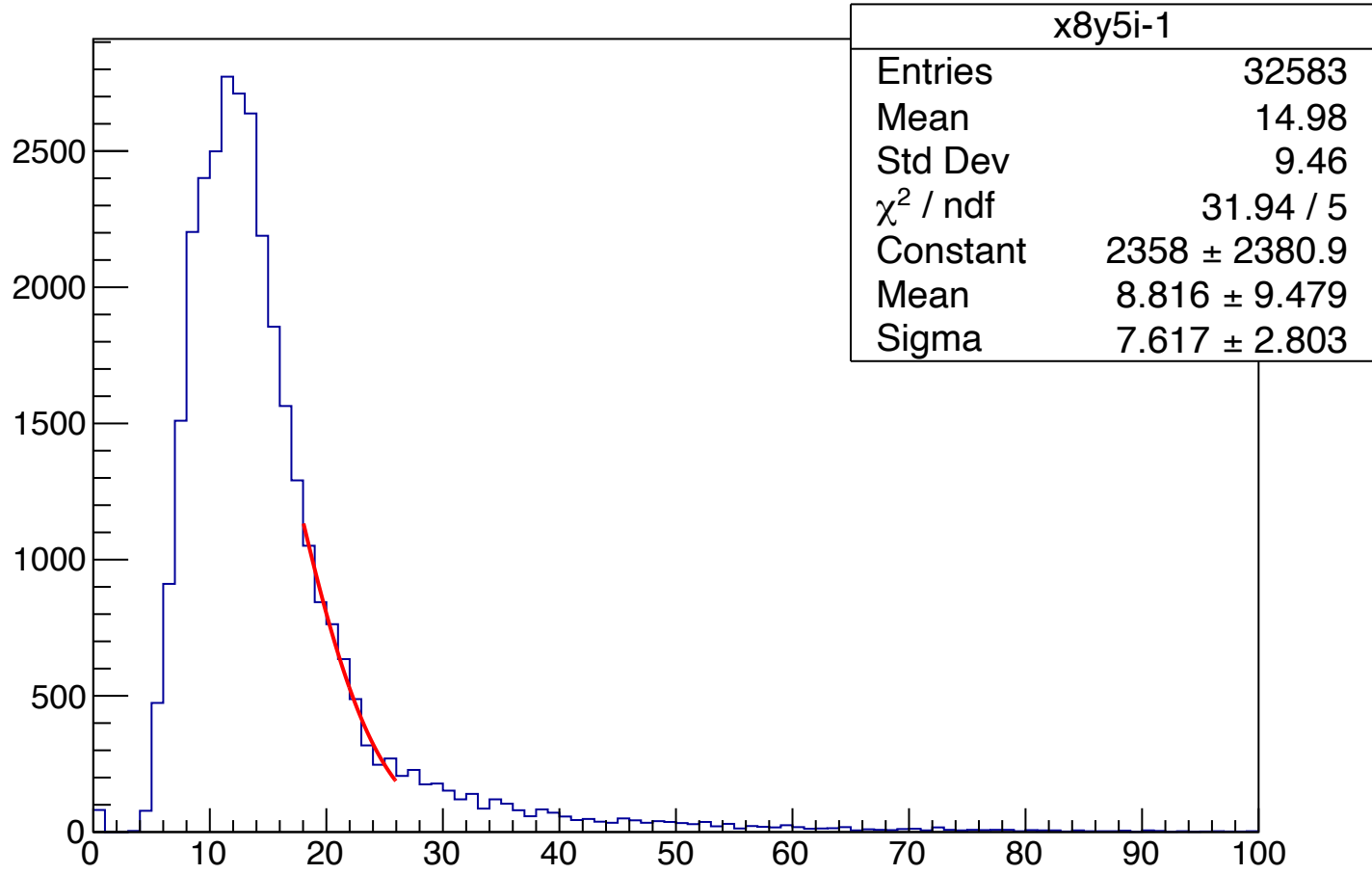
X Scan Stripe (7.92, 5) Sum of pads



X Scan Stripe (7.95, 5) Sum of pads



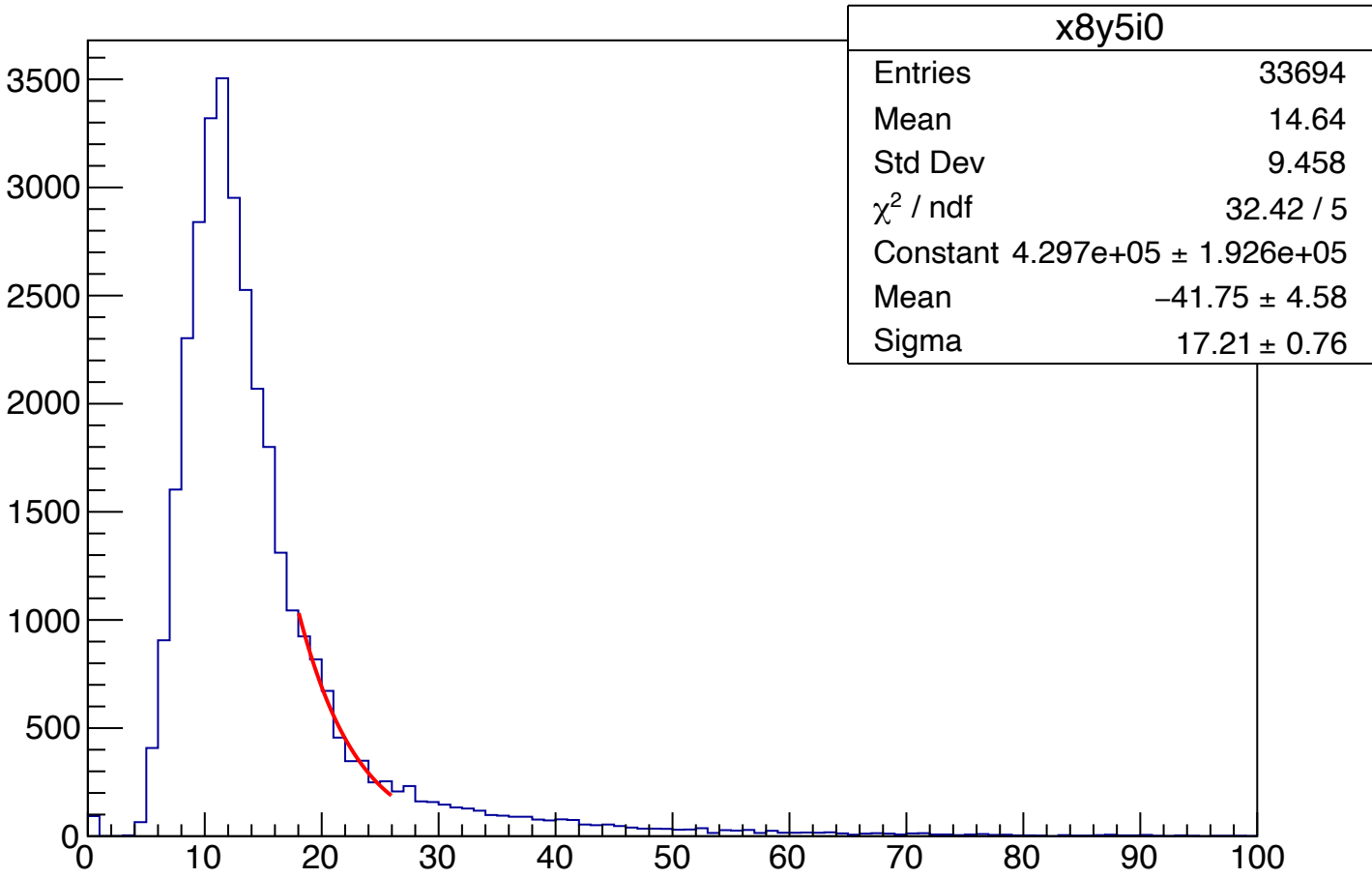
X Scan Stripe (7.97, 5) Sum of pads



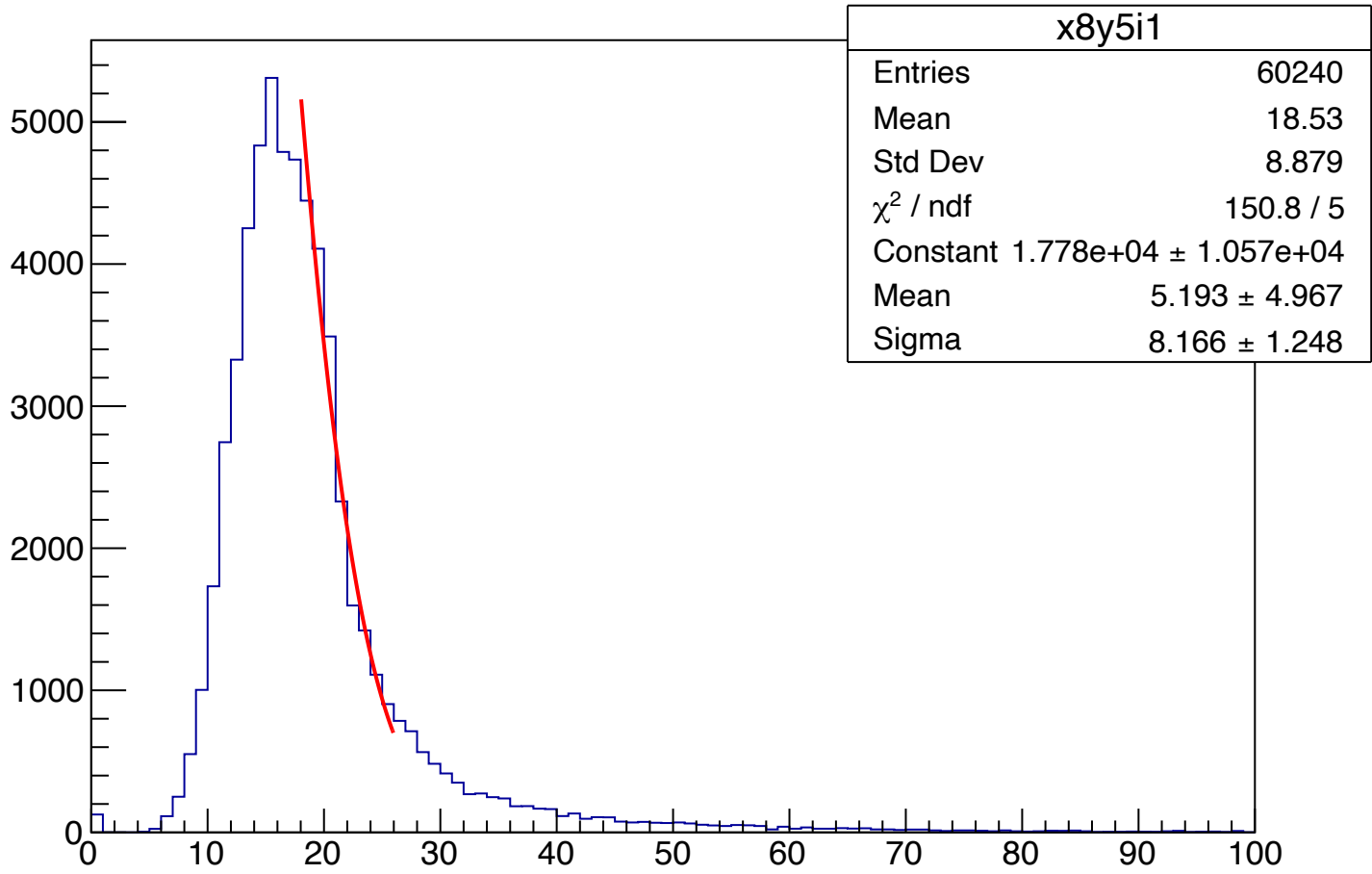
Pad (7,5)

Boundary

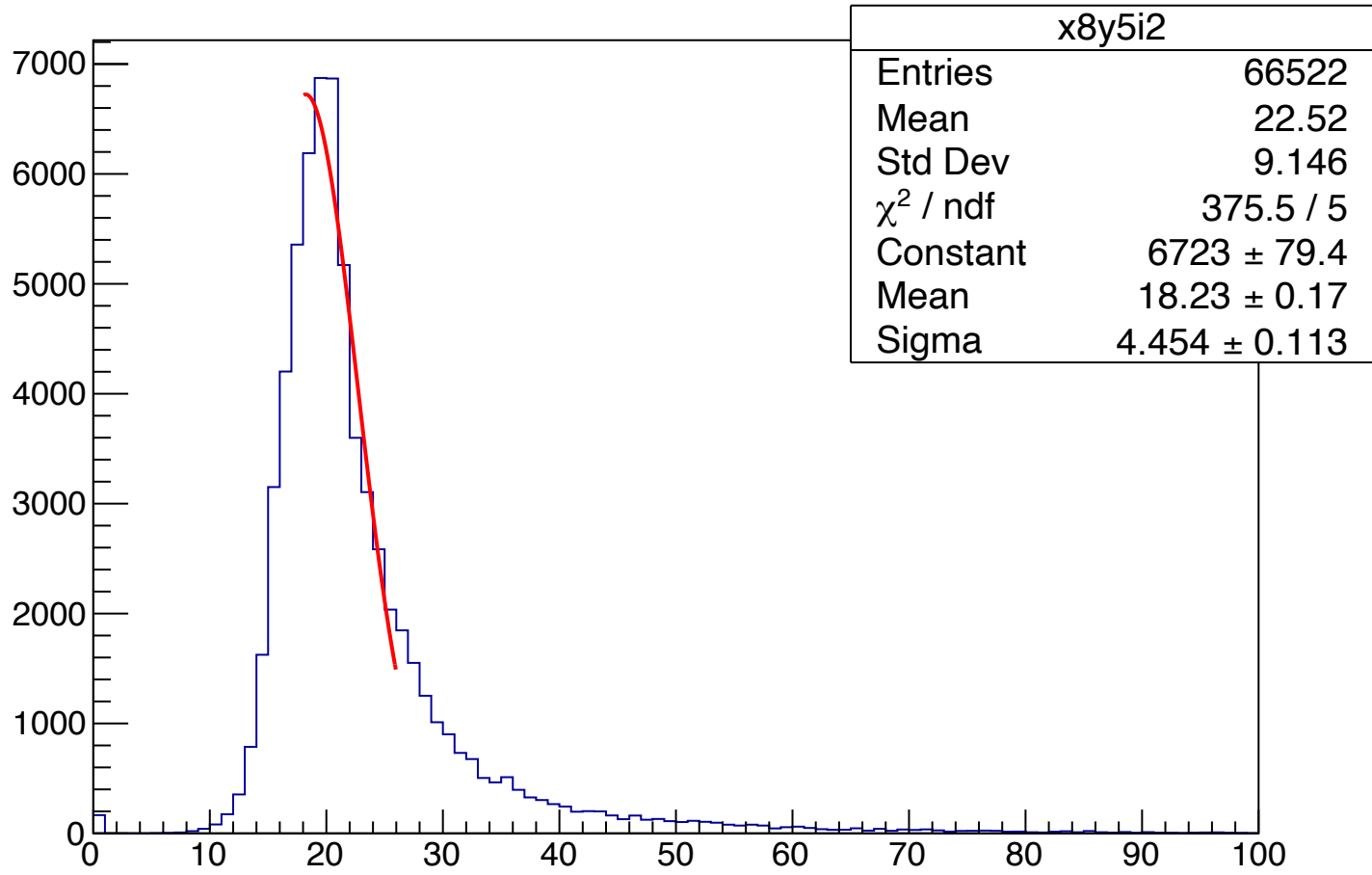
X Scan Stripe (8.00, 5) Sum of pads



X Scan Stripe (8.03, 5) Sum of pads



X Scan Stripe (8.05, 5) Sum of pads



Boundary

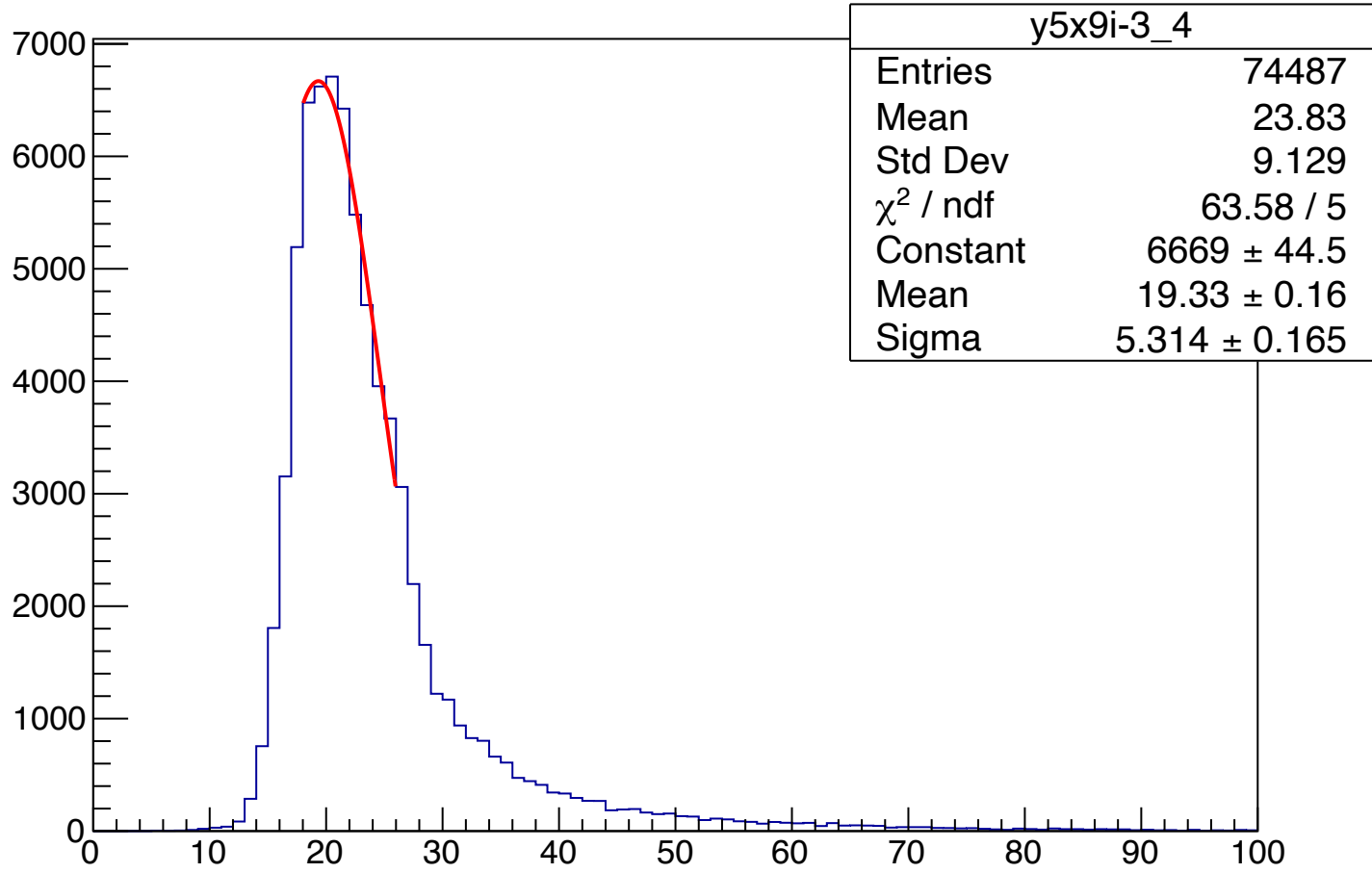
Pad (8,5)

- Some signal losses are clearly seen in the gap area: the sum of two responses drops
- Would it cause by the traces?
- Next three slides are the horizontal scan with the (almost) same area

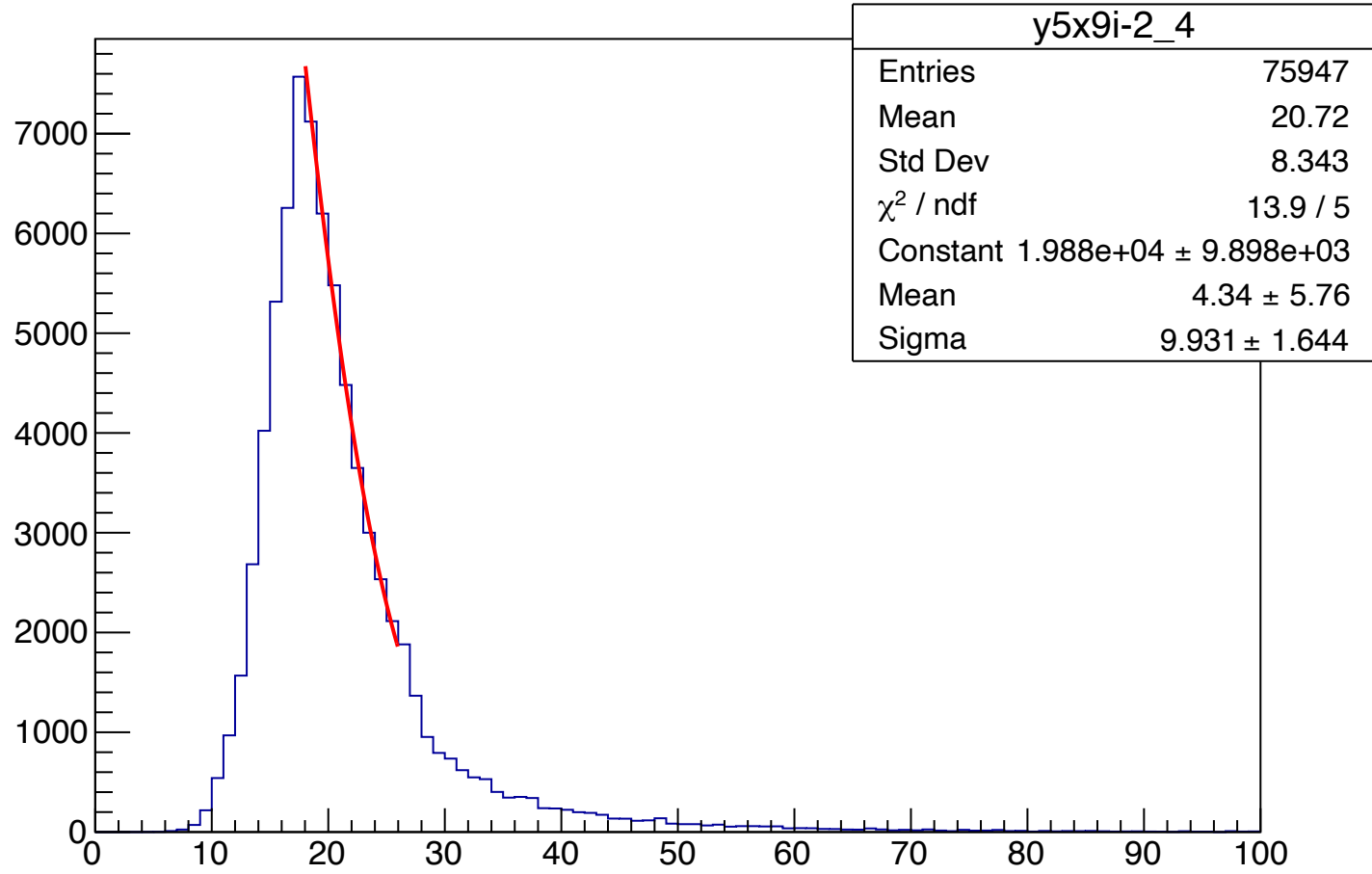
Step: 125 um

Reproduce on Y1: Downer pad

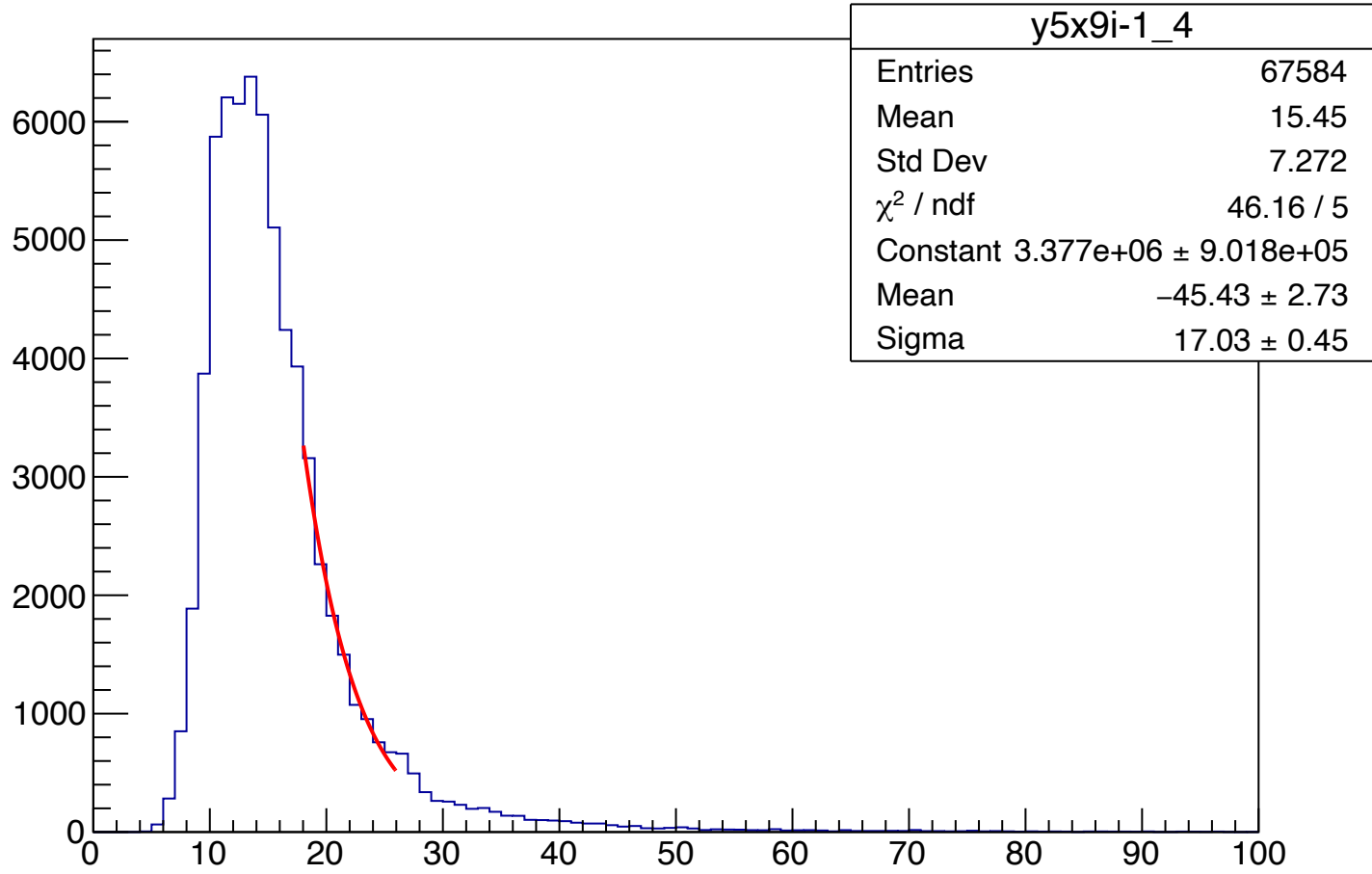
Y Scan Stripe (9, 4.92) Down pad



Y Scan Stripe (9, 4.95) Down pad



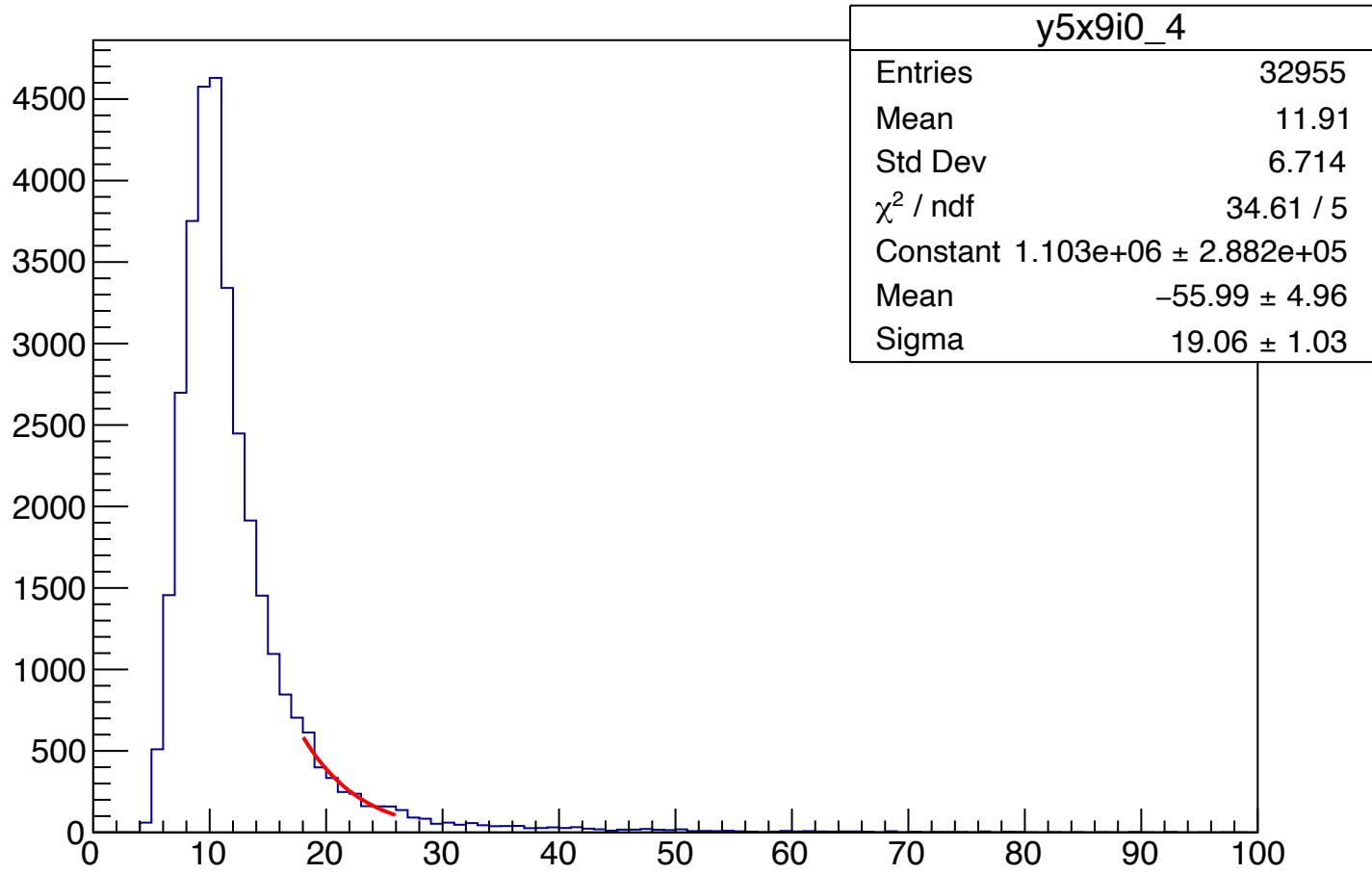
Y Scan Stripe (9, 4.97) Down pad



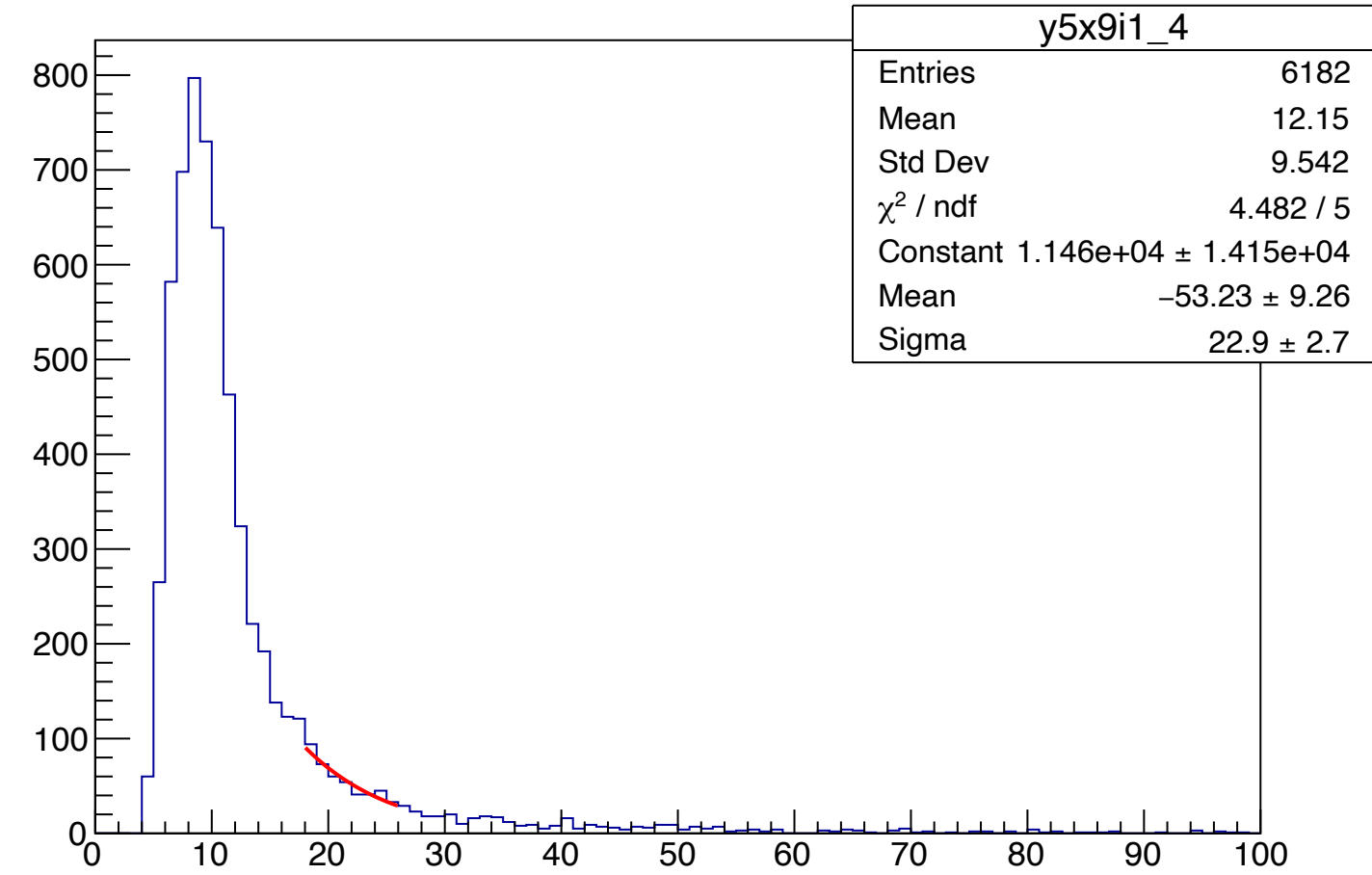
Pad (9,4)

Boundary

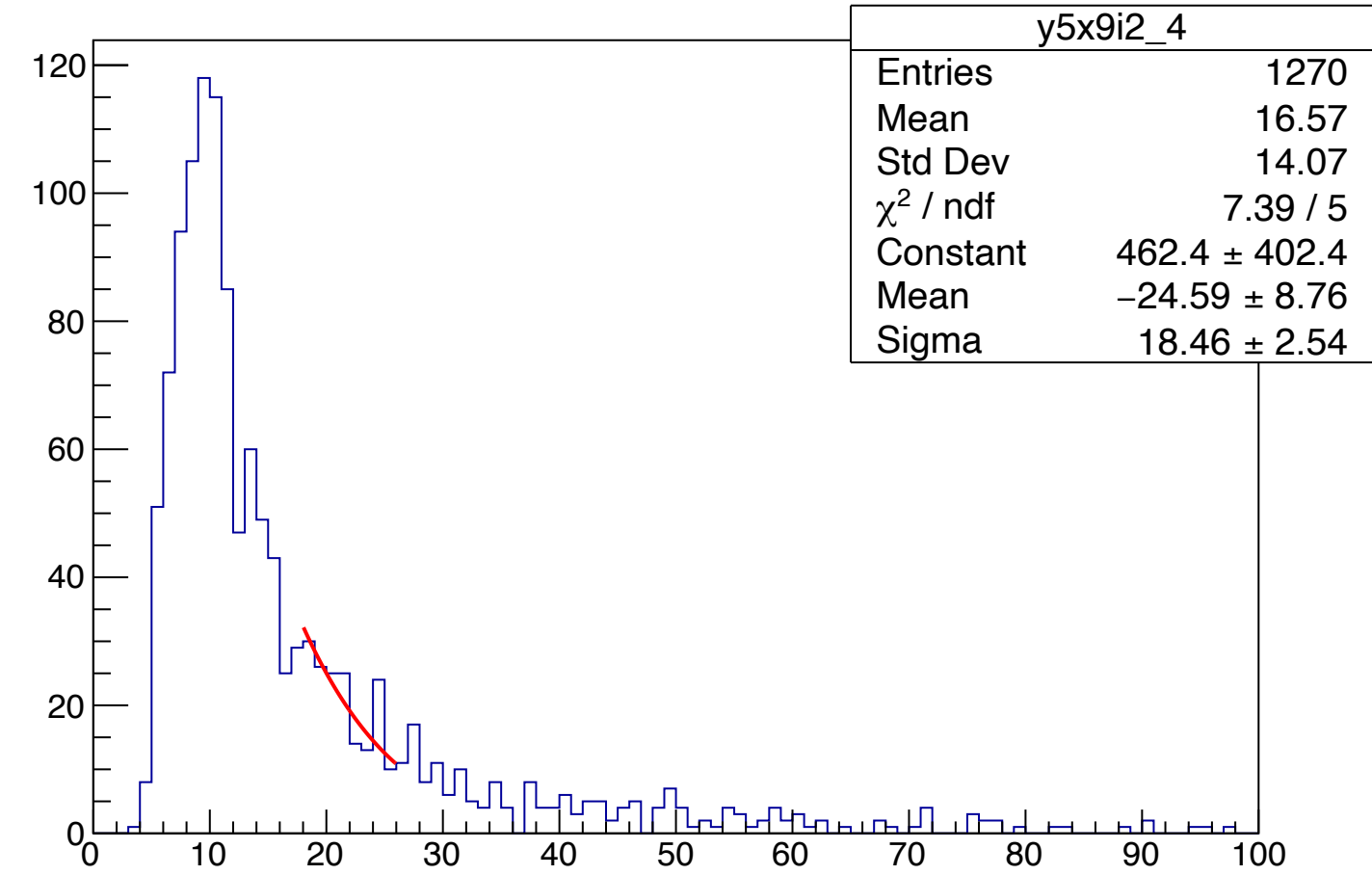
Y Scan Stripe (9, 5.00) Down pad



Y Scan Stripe (9, 5.03) Down pad



Y Scan Stripe (9, 5.05) Down pad

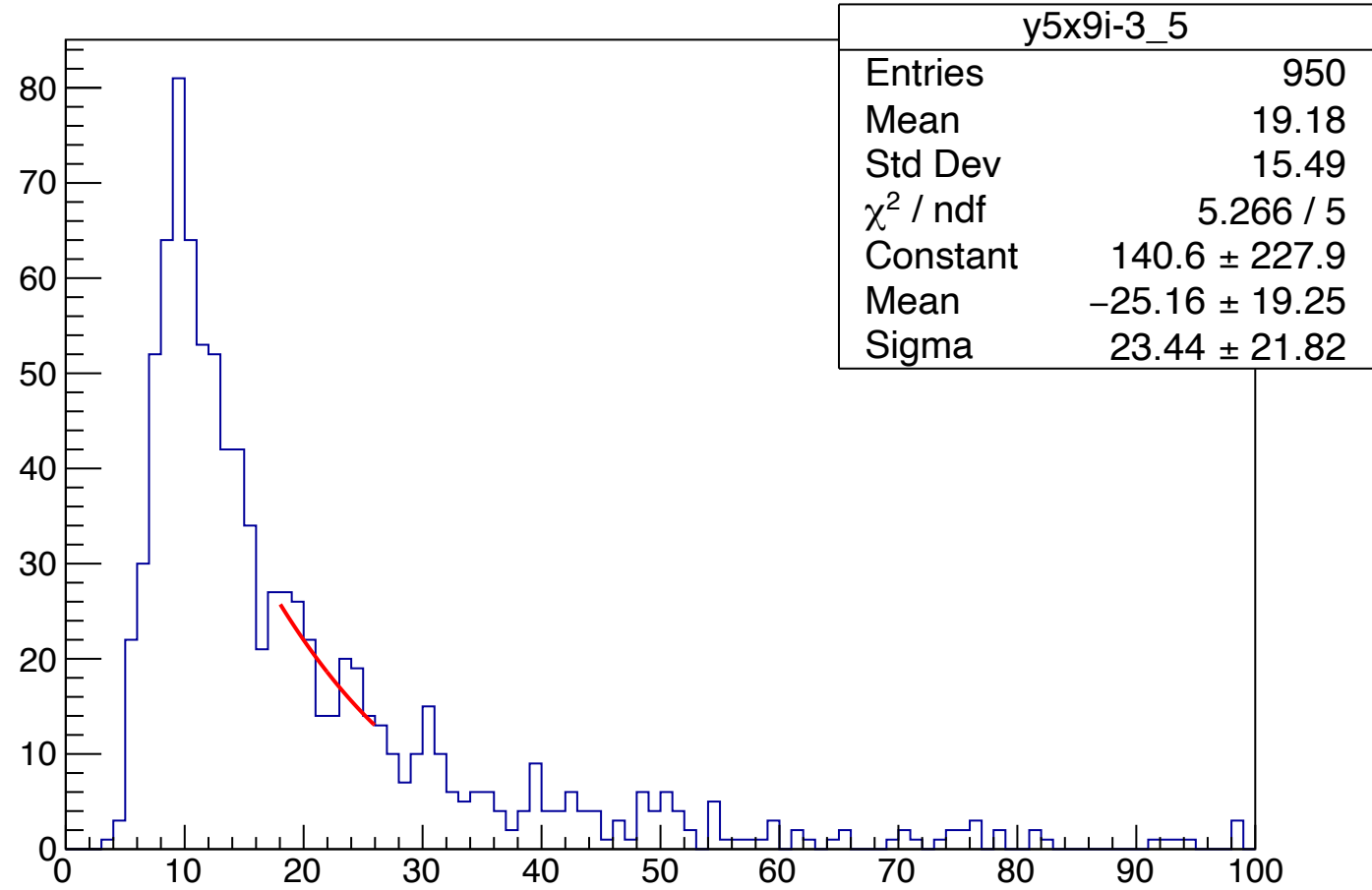


Boundary

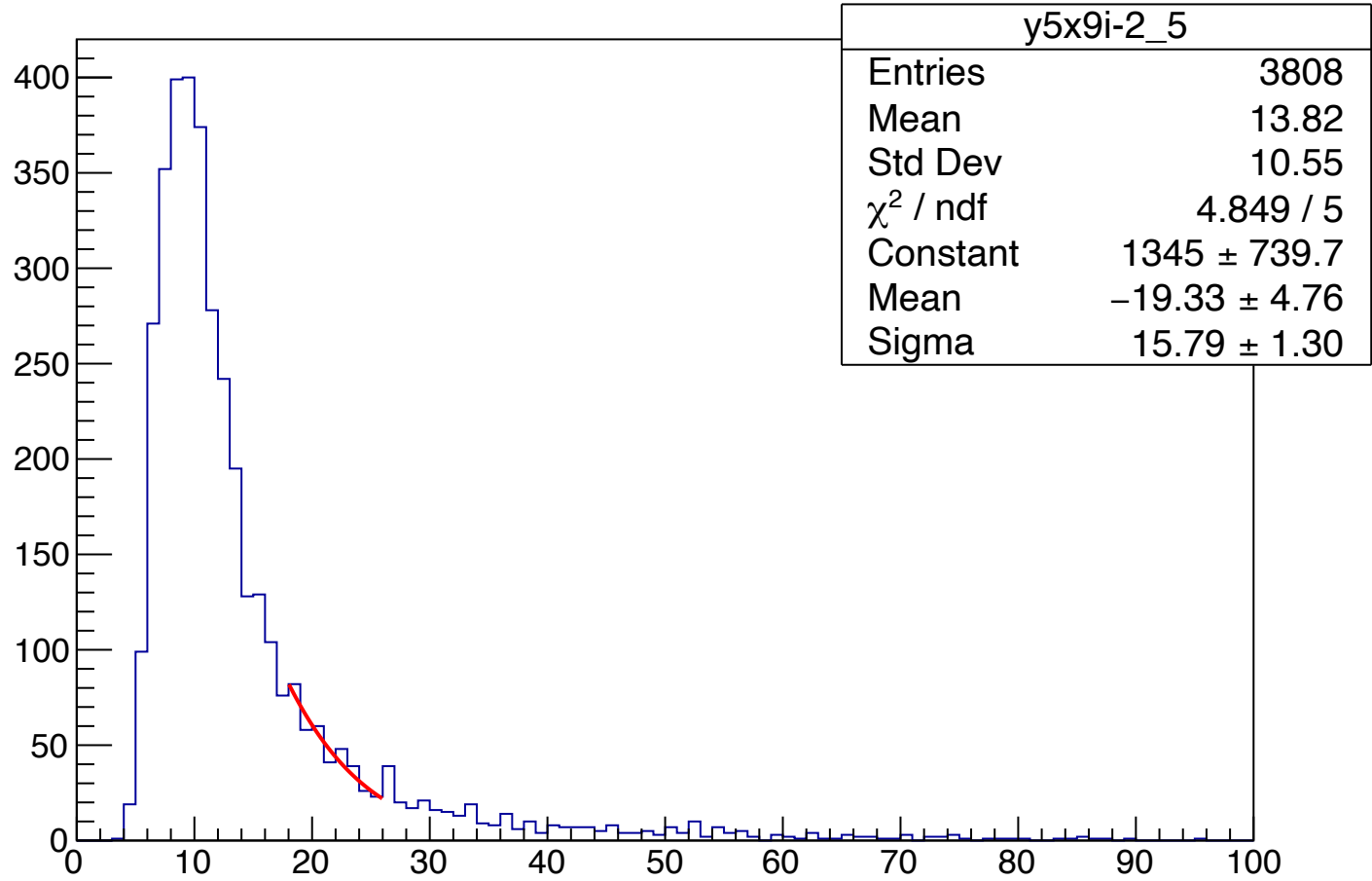
Step: 125 um

Reproduce on Y1: Upper pad

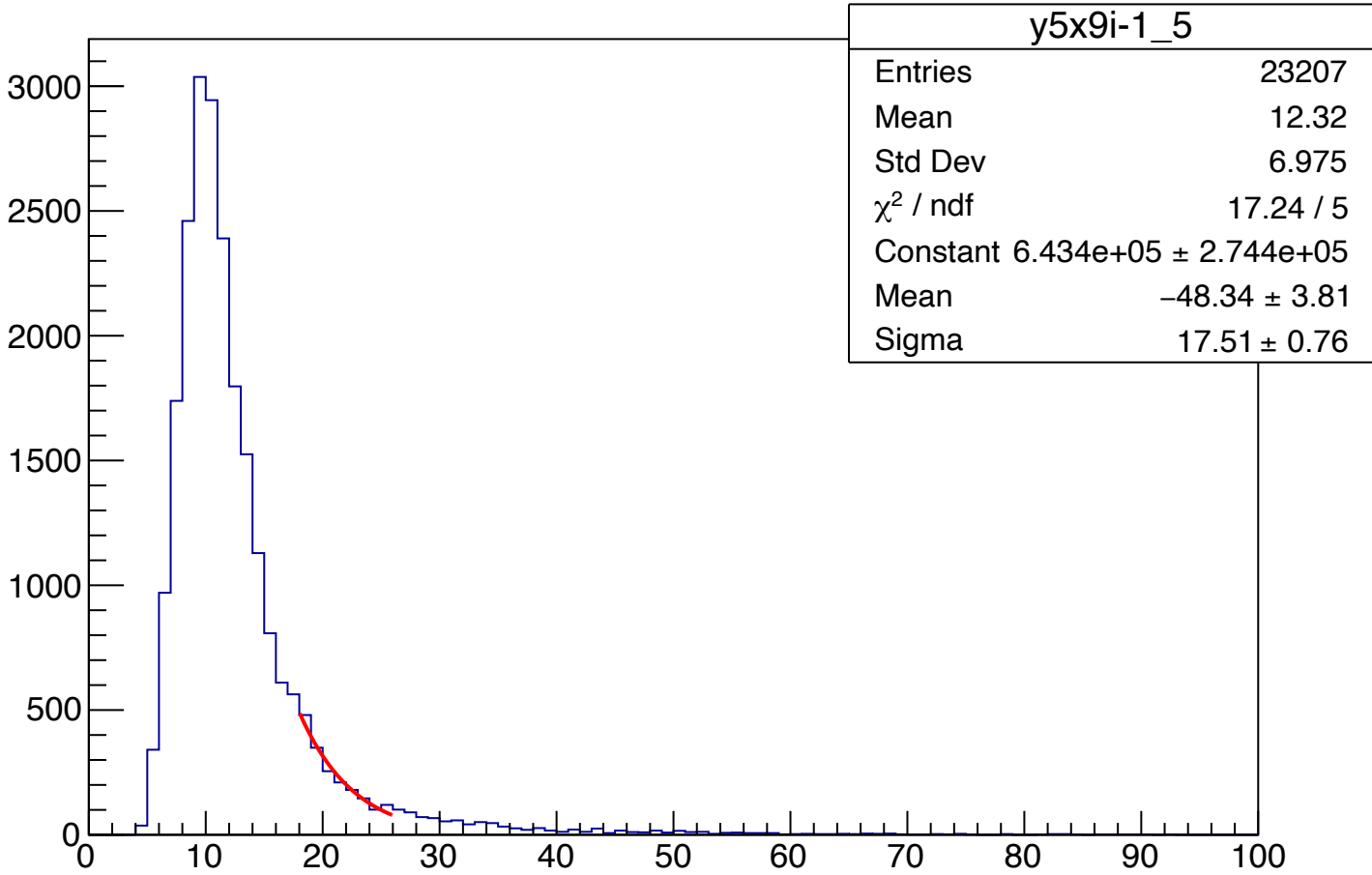
Y Scan Stripe (9, 4.92) Up pad



Y Scan Stripe (9, 4.95) Up pad



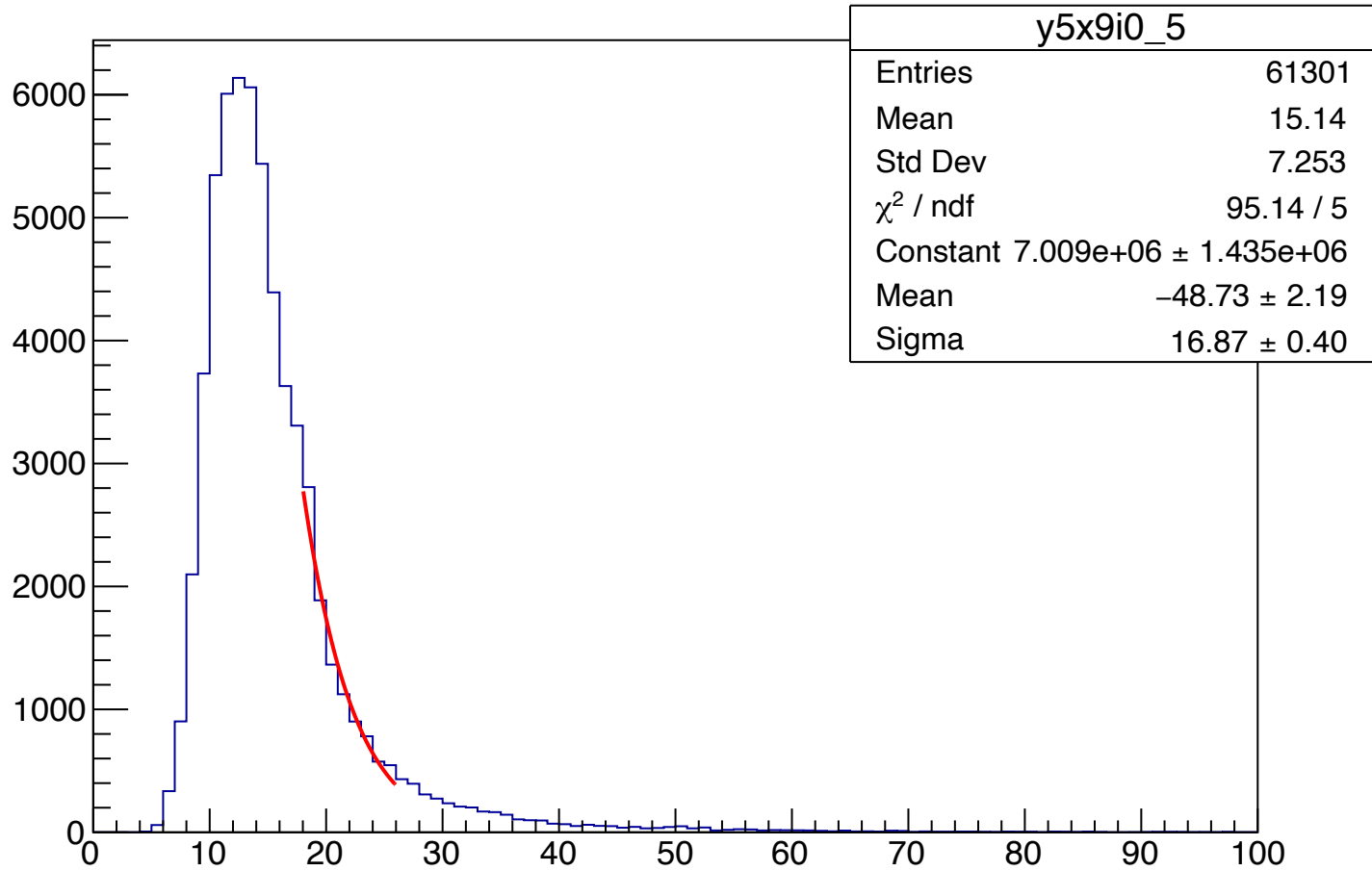
Y Scan Stripe (9, 4.97) Up pad



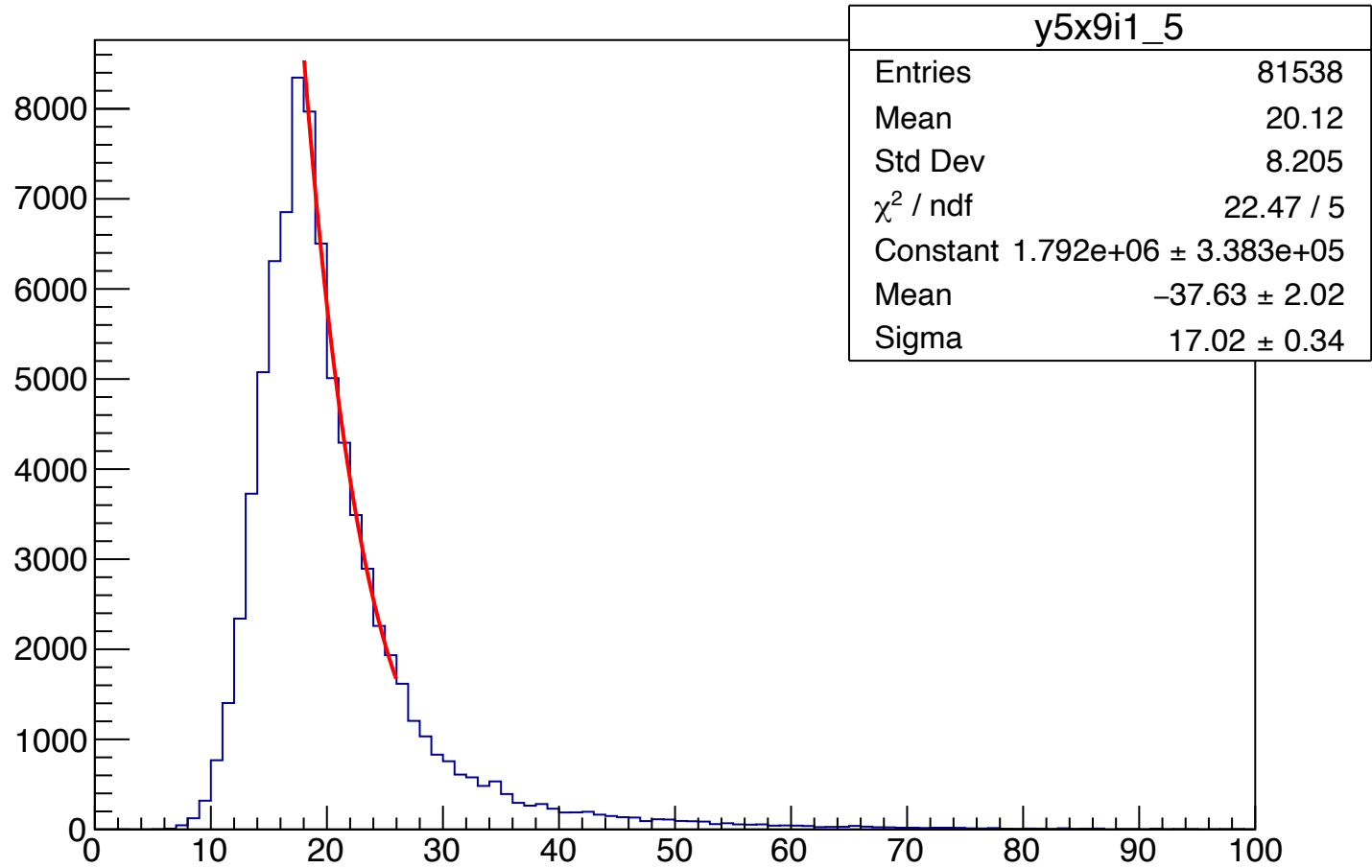
Pad (9,4)

Boundary

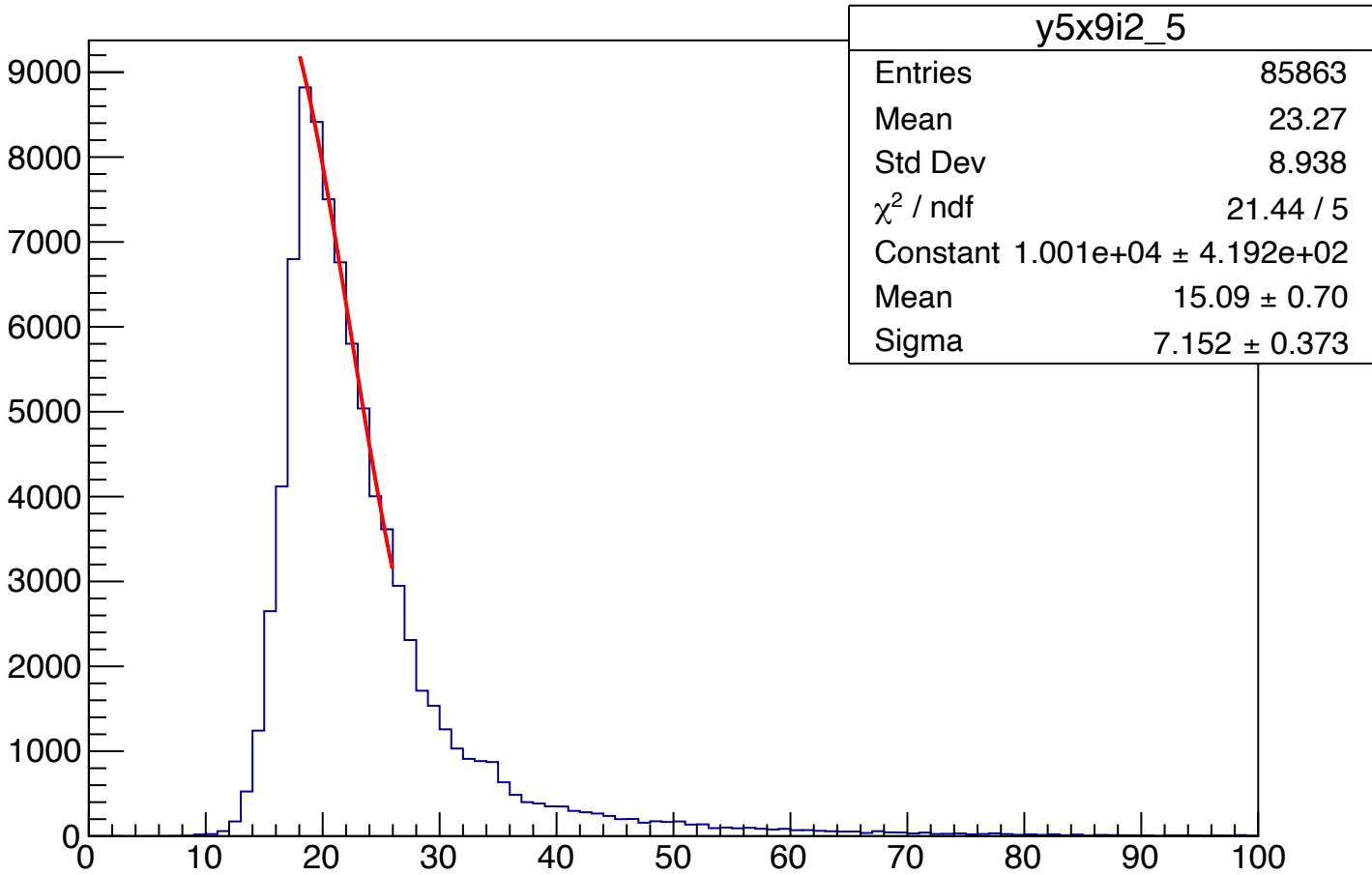
Y Scan Stripe (9, 5.00) Up pad



Y Scan Stripe (9, 5.03) Up pad



Y Scan Stripe (9, 5.05) Up pad

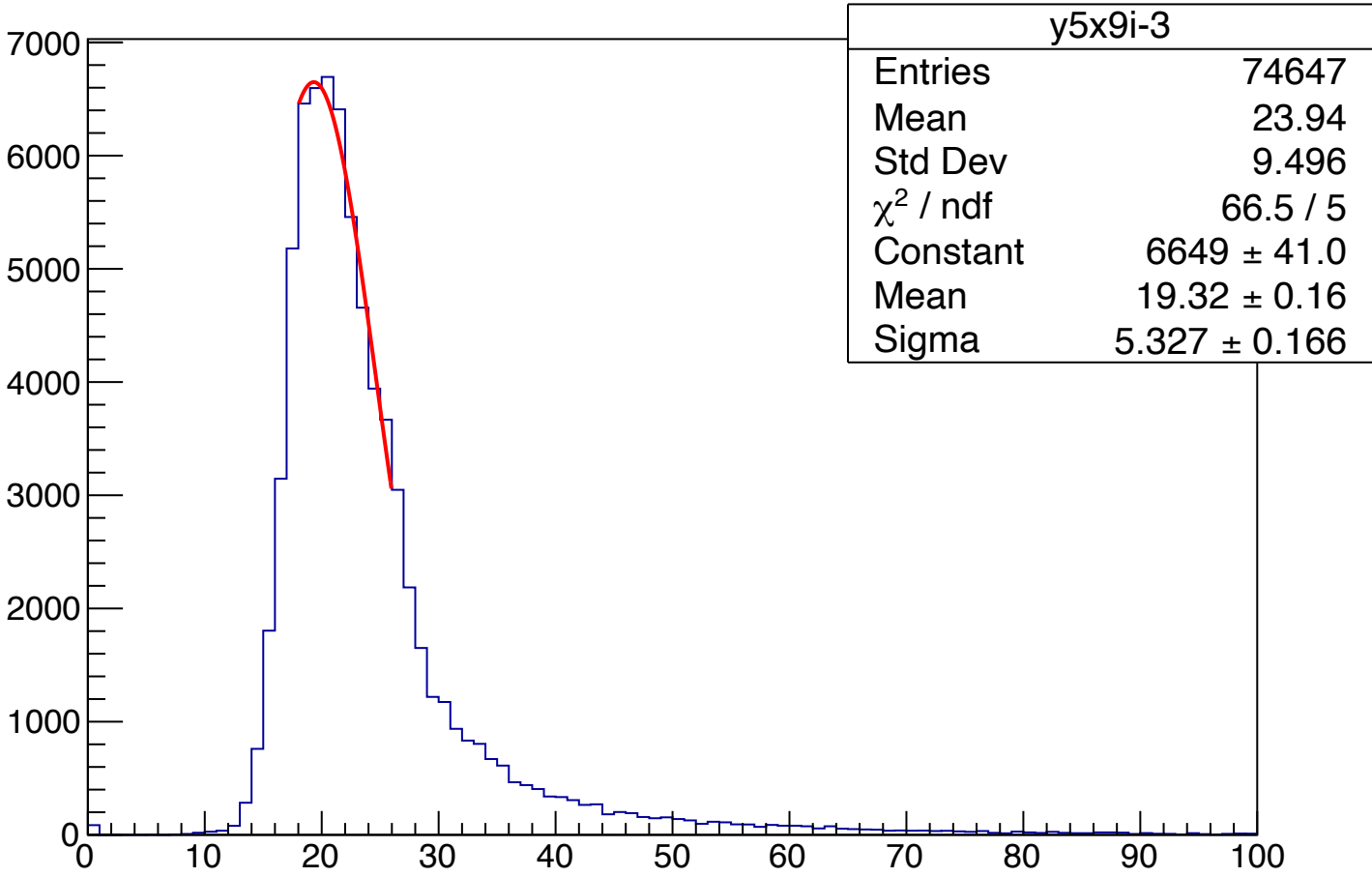


Boundary

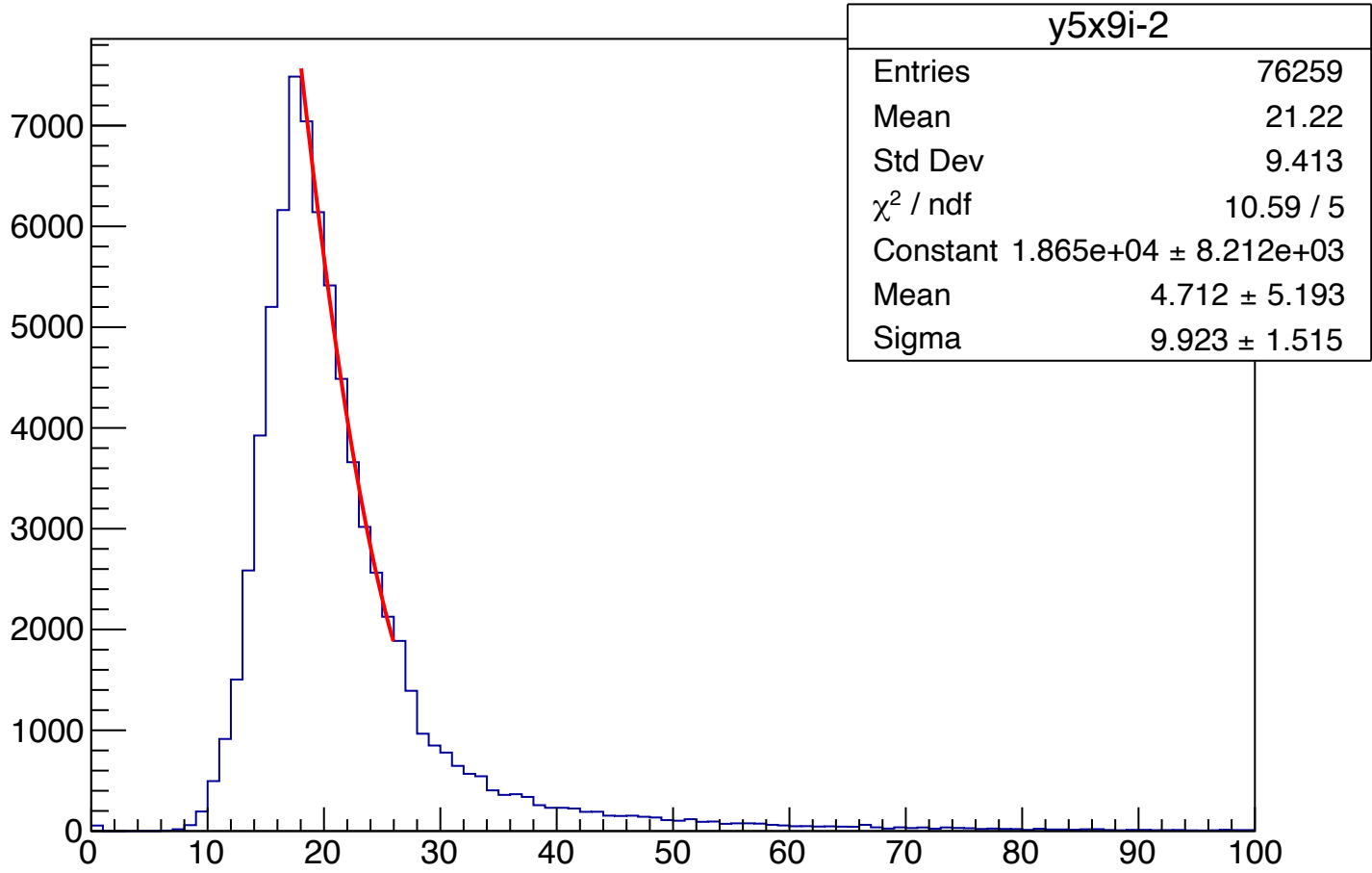
Step: 125 um

Reproduce on Y1: Sum of two pads

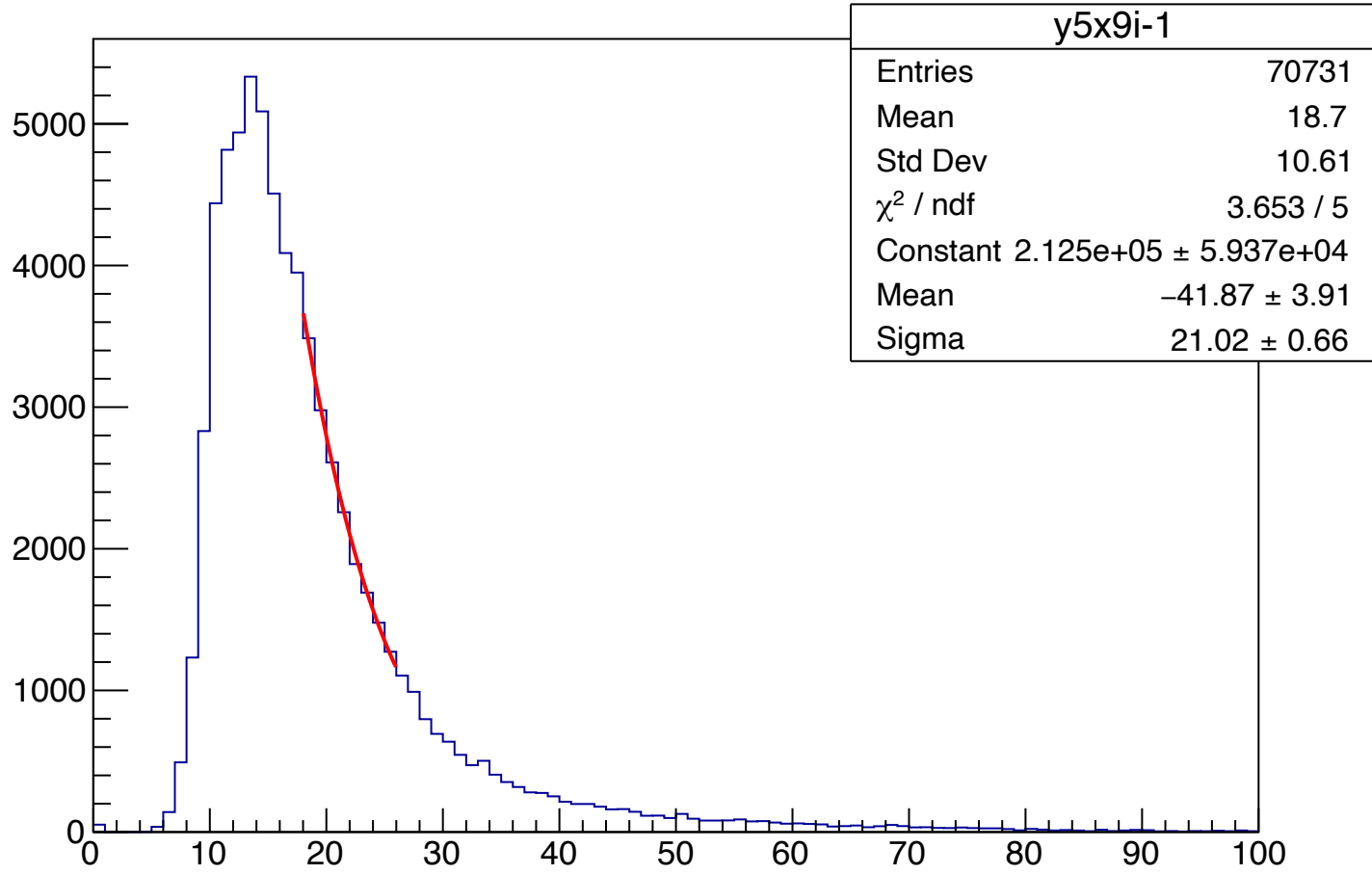
Y Scan Stripe (9, 4.92) Sum of pads



Y Scan Stripe (9, 4.95) Sum of pads



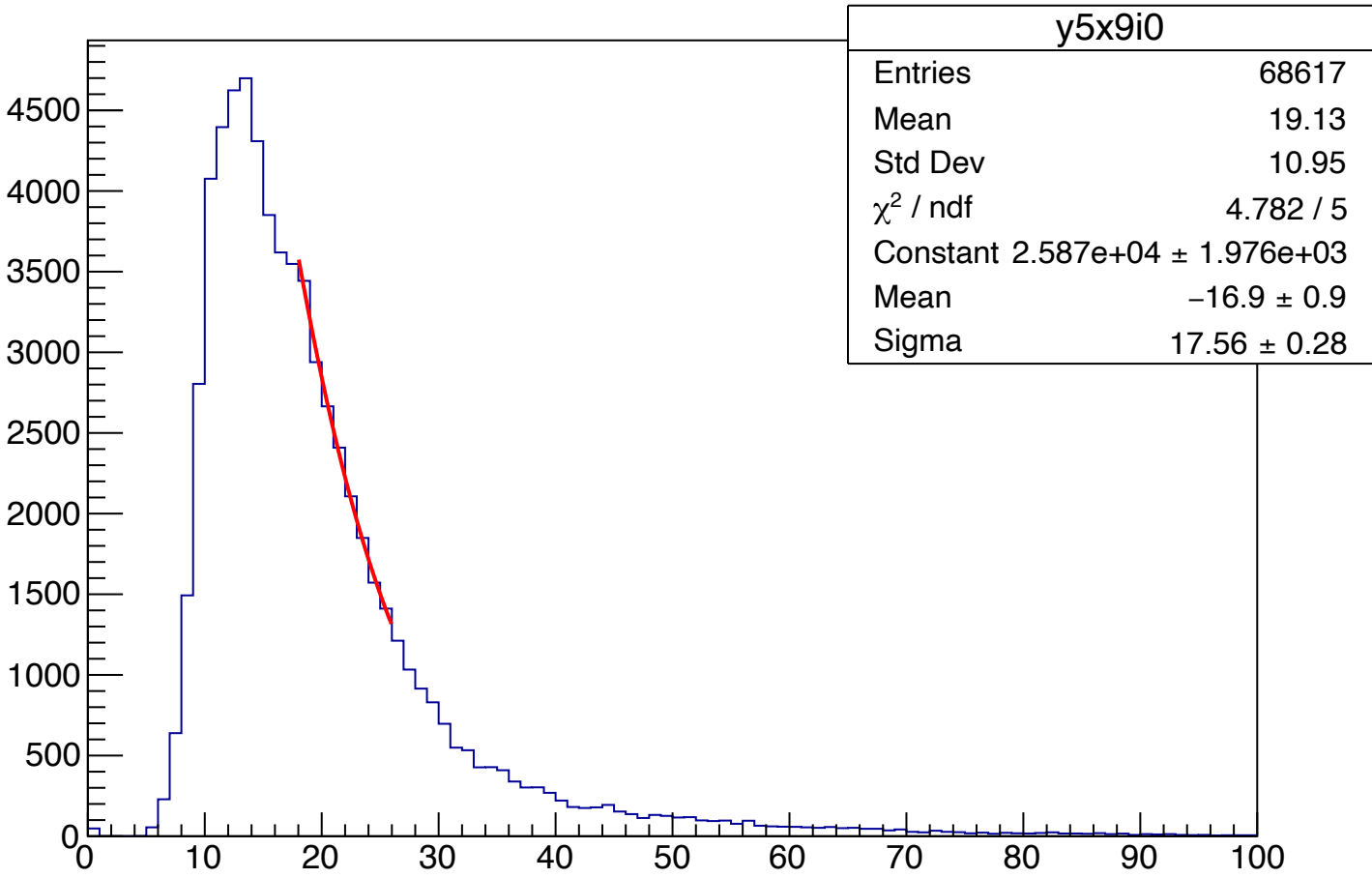
Y Scan Stripe (9, 4.97) Sum of pads



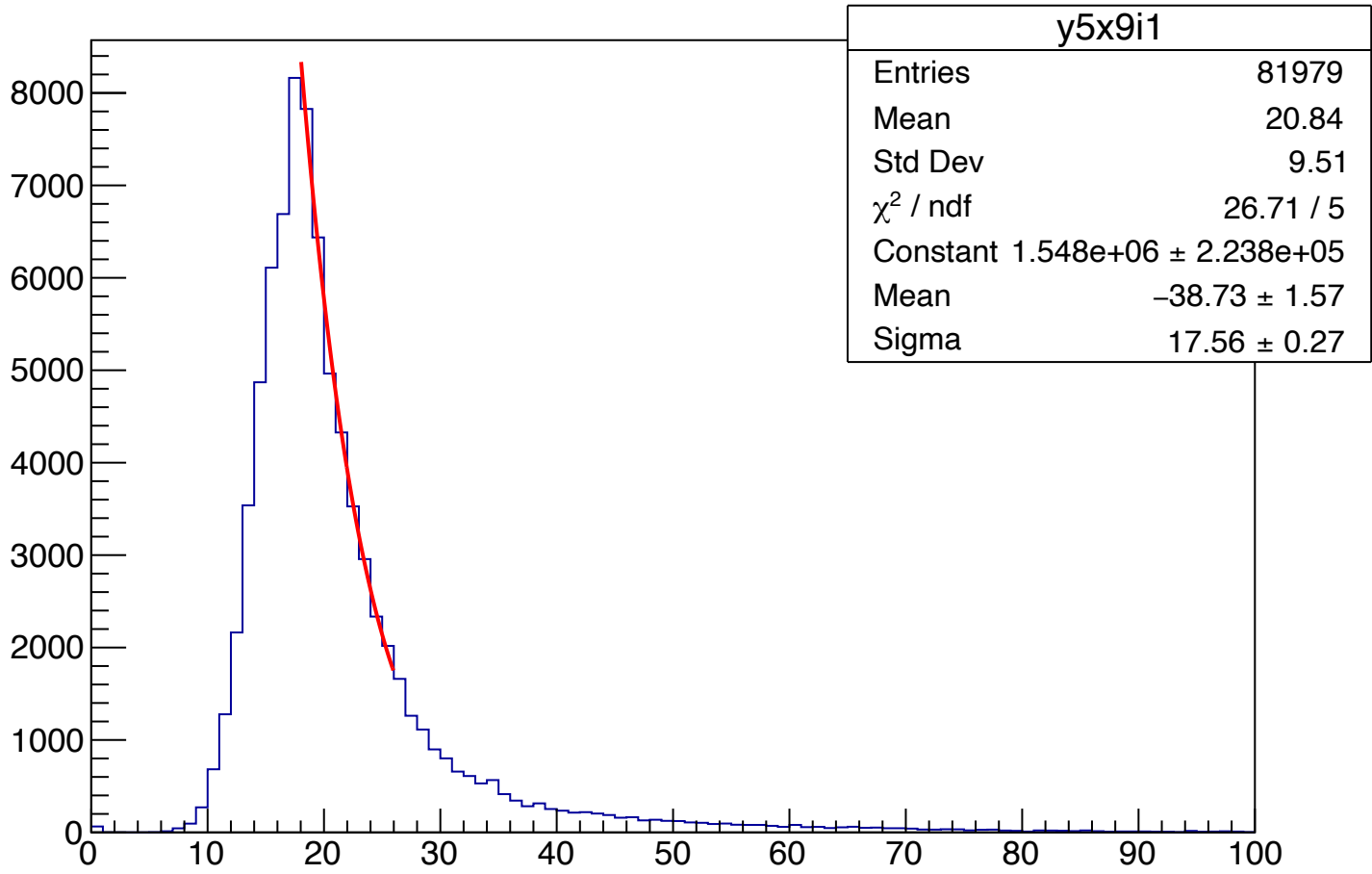
Pad (9,4)

Boundary

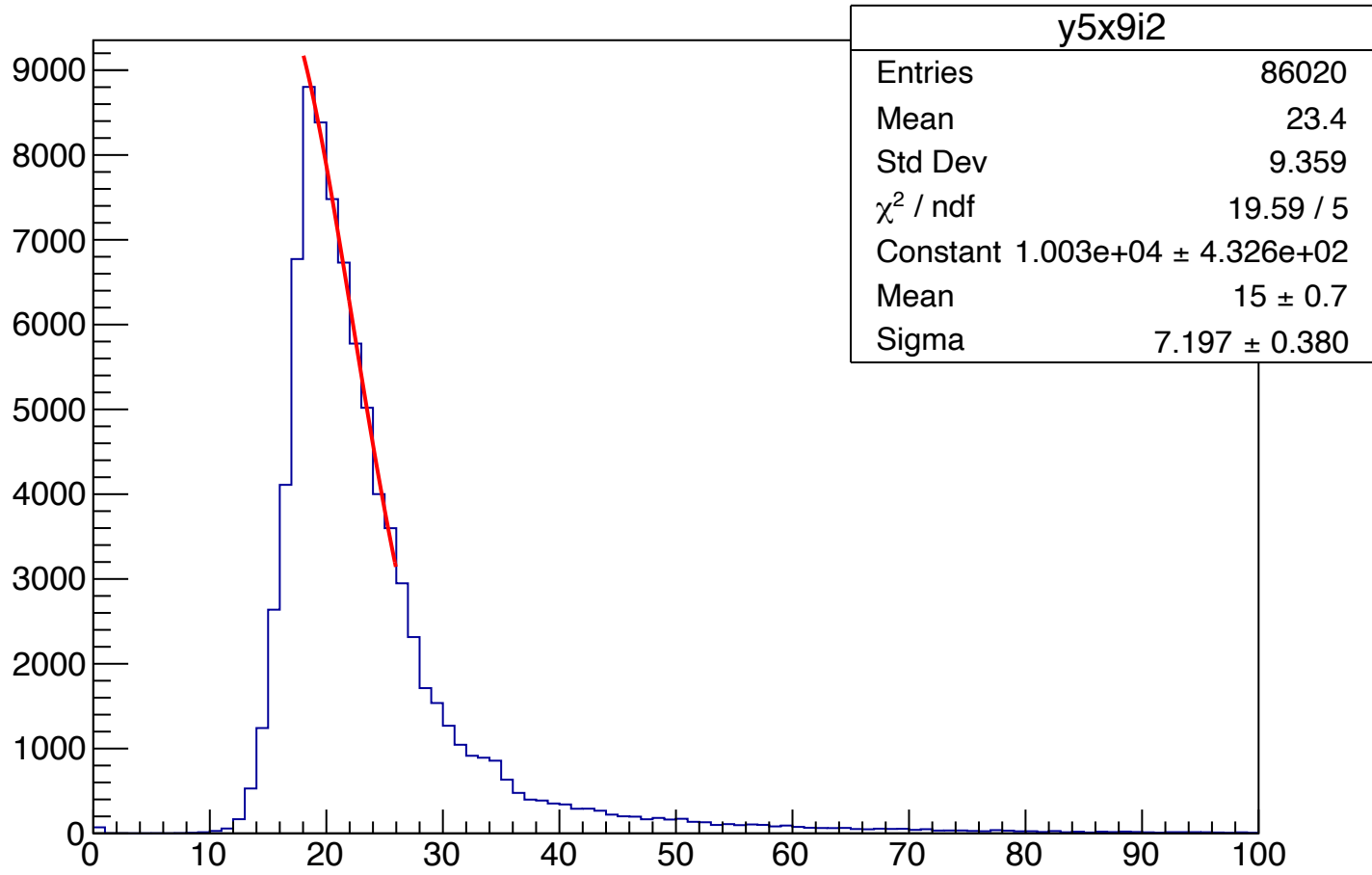
Y Scan Stripe (9, 5.00) Sum of pads



Y Scan Stripe (9, 5.03) Sum of pads



Y Scan Stripe (9, 5.05) Sum of pads



Boundary

Pad (9,5)

- It's difficult to say we see signal “sharing” rather than “jumping” and “losing”, on silicon and GaAs sensors
- “Jumping” might actually be good for the experiment
- Figures need to be quantified
- And a “sanity” check for the telescope:
 - plotting the aligned position histogram for each runs
 - and a simulation on Alpex squared