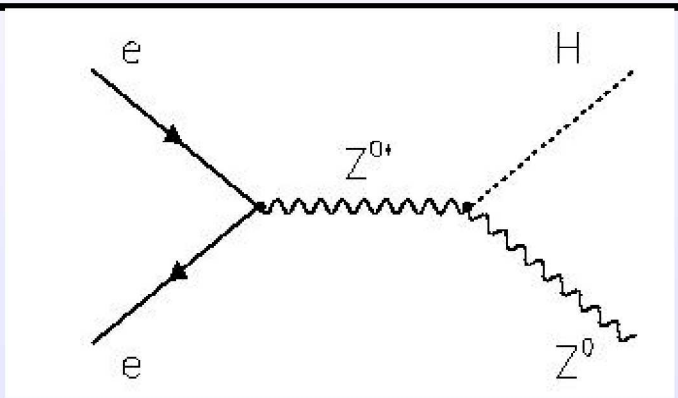
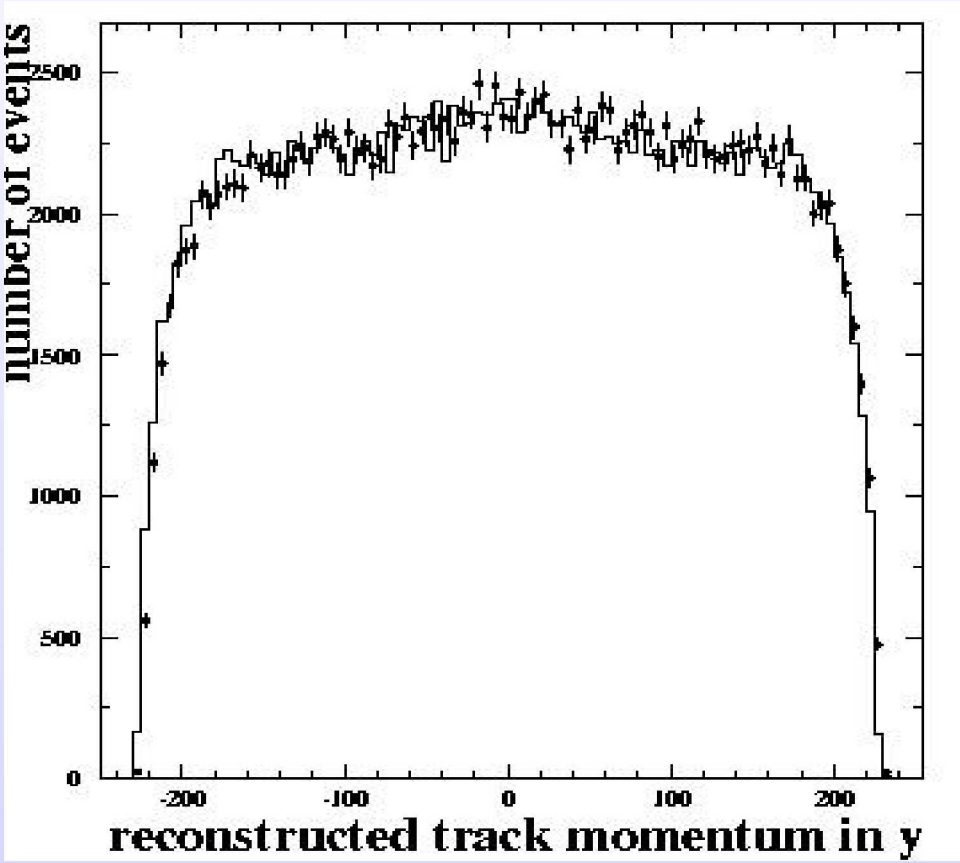
Influence of a crab crossing angle on the recoil mass spectrum at TESLA

Thorsten Kuhl
DESY Hamburg

Analysis procedure





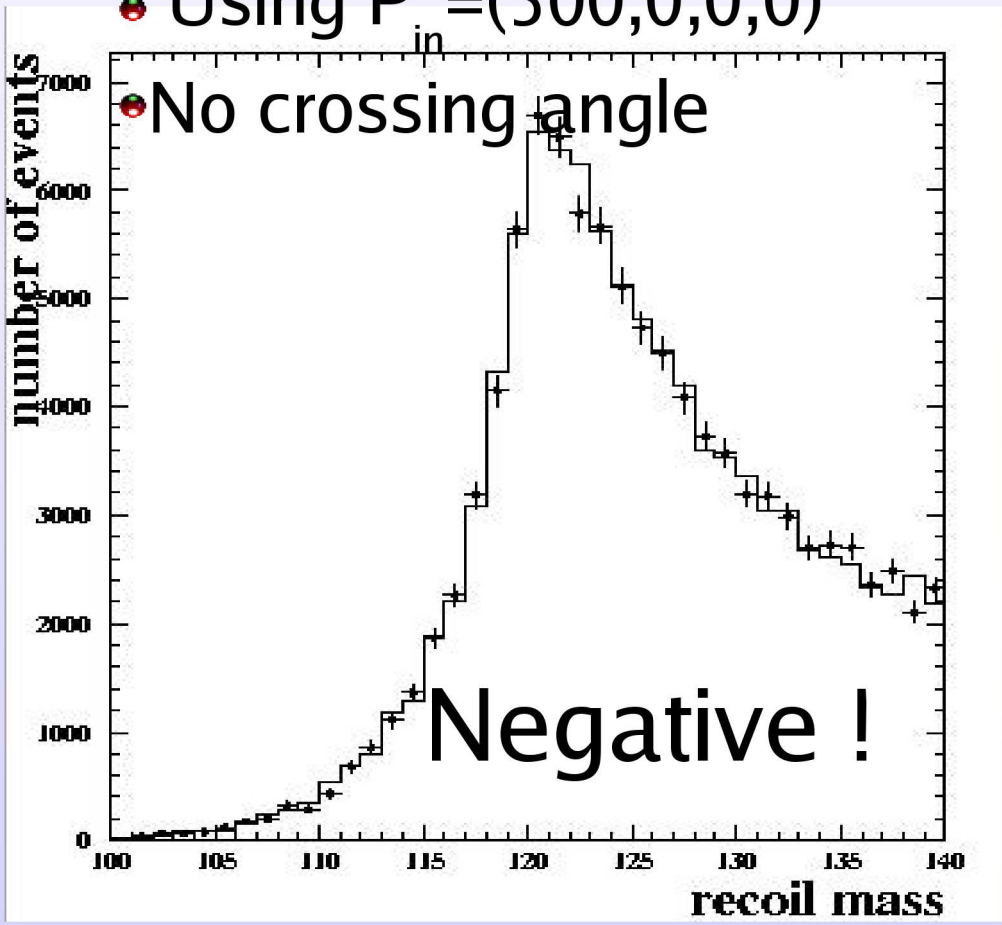
- Process: HZ-->xxmumu
- Simulation: Pythia6.1x with new CIRCE; Simdet 4.0x
- Energy: 500 GeV
- Crab cross angle---> 5 GeV P_y
- Plot: P_y spectrum
- Line: no crossing angle
- Error bars: with crossing angle

First check

$$m_{recoil} = \sqrt{(P_{in} - P_1 - P_2)^2}$$

- Recoil mass: Reconstruct Higgs mass from the 4-momentum of the Z decay products P_1 and P_2
- Do we see a different in the left and right hemisphere of the detetcor w/o crossing angle?

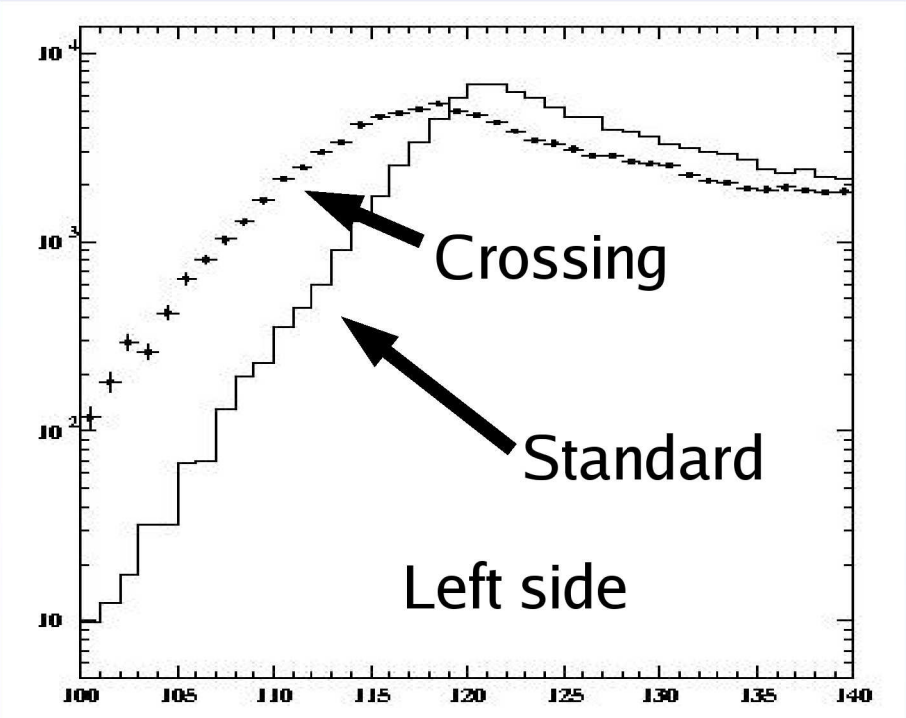
- Using P_{in}=(500,0,0,0)
- No crossing angle



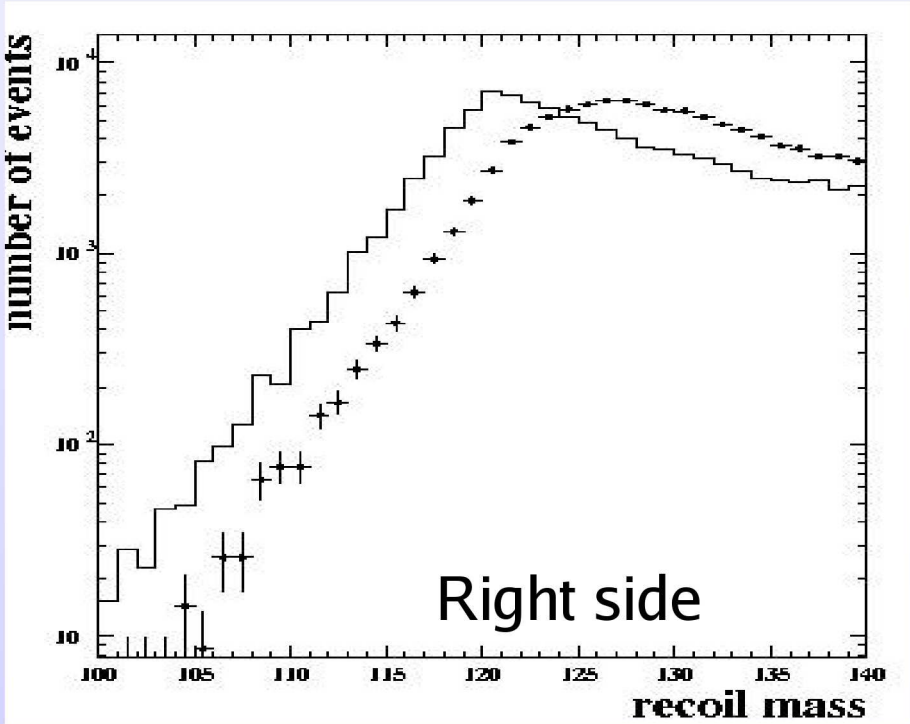
Second check

- second check: Can we see something ?

- Using P_{in}=(500,0,0,0) for crossing angle events



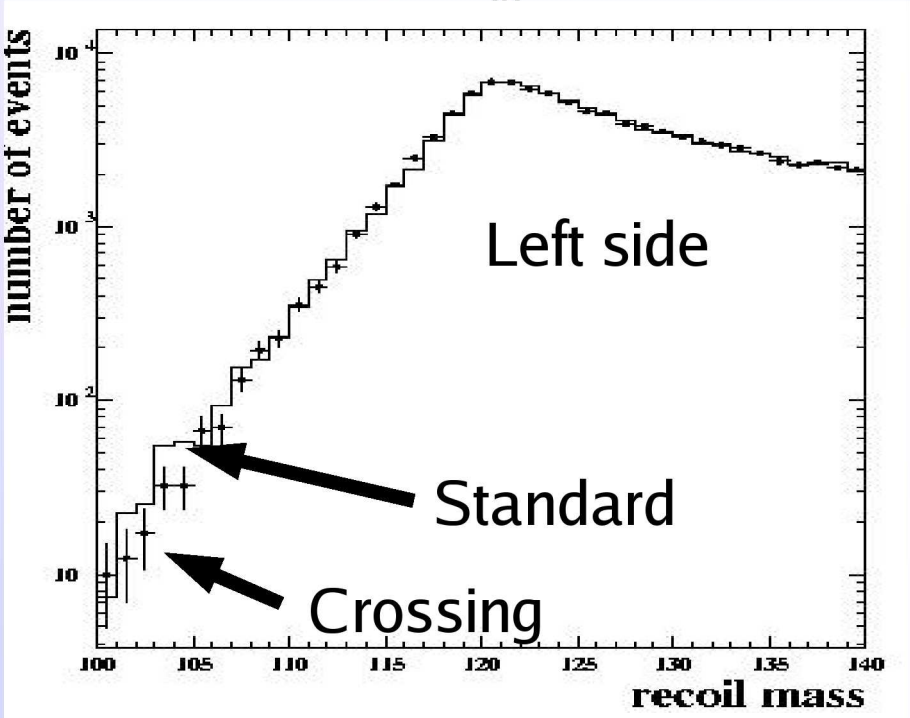
$$m_{recoil} = \sqrt{(P_{in} - P_1 - P_2)^2}$$

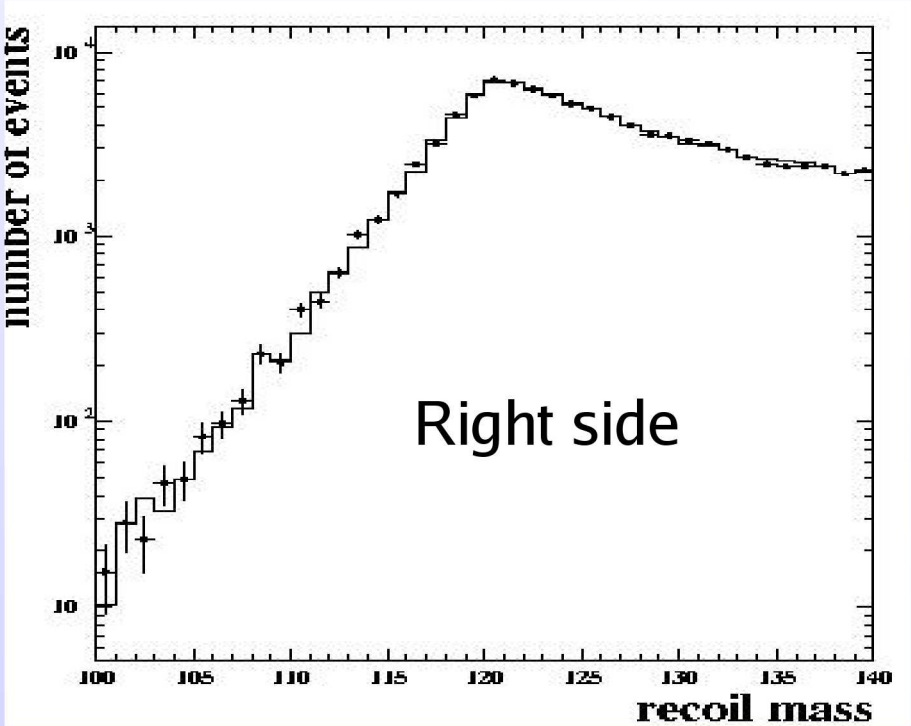


Of course !

Do we see something?

- Standard vs crossing using correct boost in recoil formula e.g. P_{in}=(500,0,5,0) GeV for crossing angle

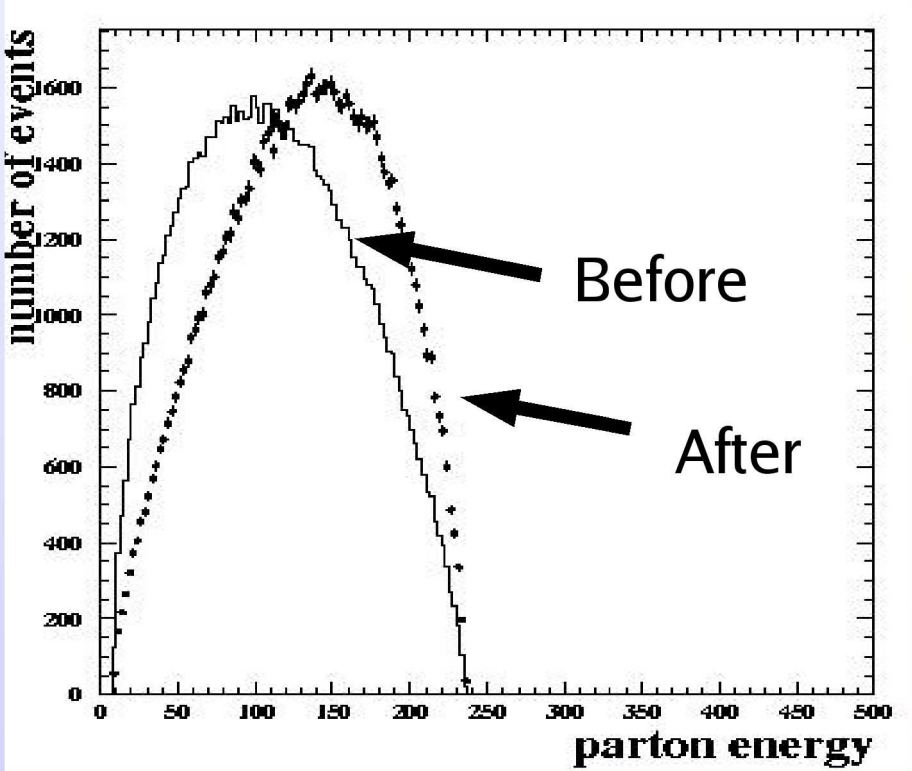




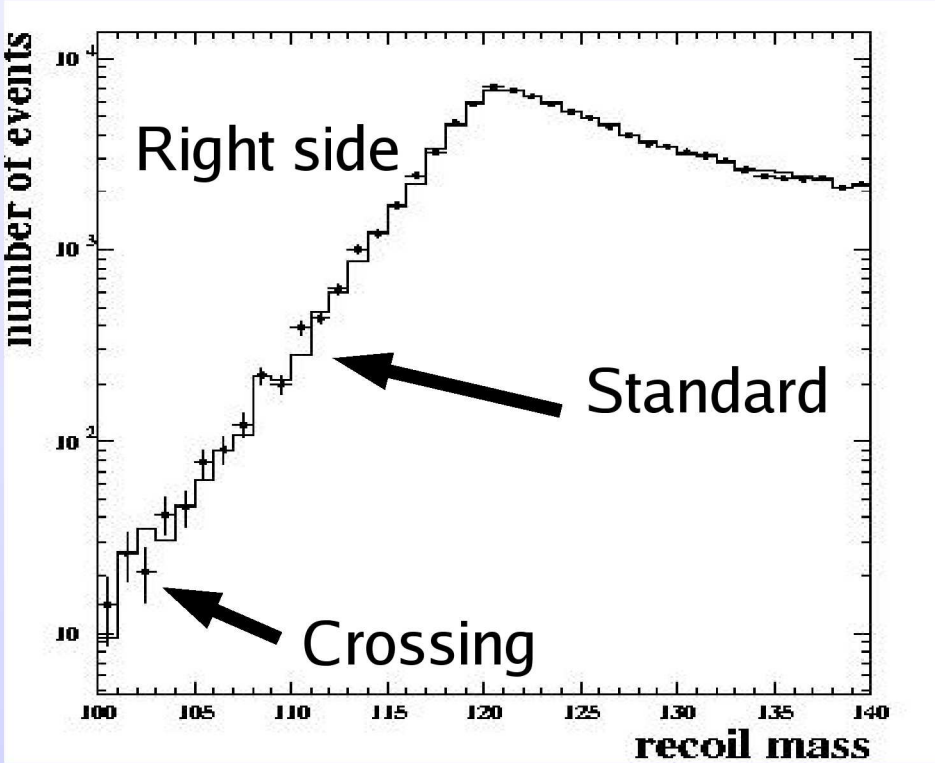
Negative !

Energy dependent jet efficiency

- Possible systematic effect ...!?
  - Brute force rescaling:



  - Result:



Negative !

Summary

- Testing influence of crossing angle on physics analysis
- Recoilspectrum of Higgs-Strahlung:
- No effect seen
- Energy dependent Jet energy: no effect seen