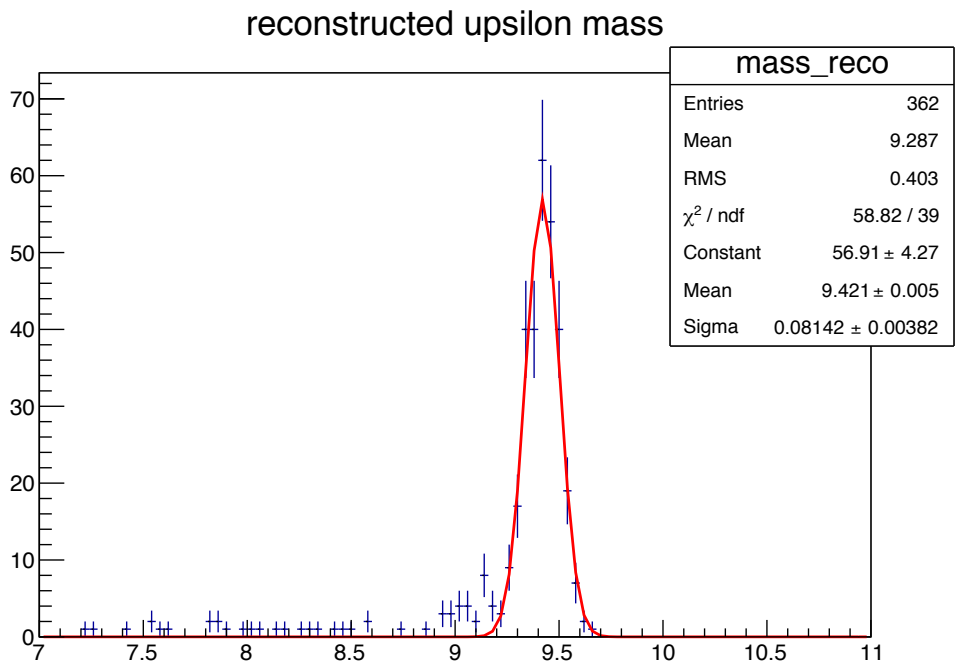
TPC simulation goals

- Evaluate cost/benefit to add TPC to sPHENIX
- Primary figure-of-merit = Upsilon mass resolution and signal-noise



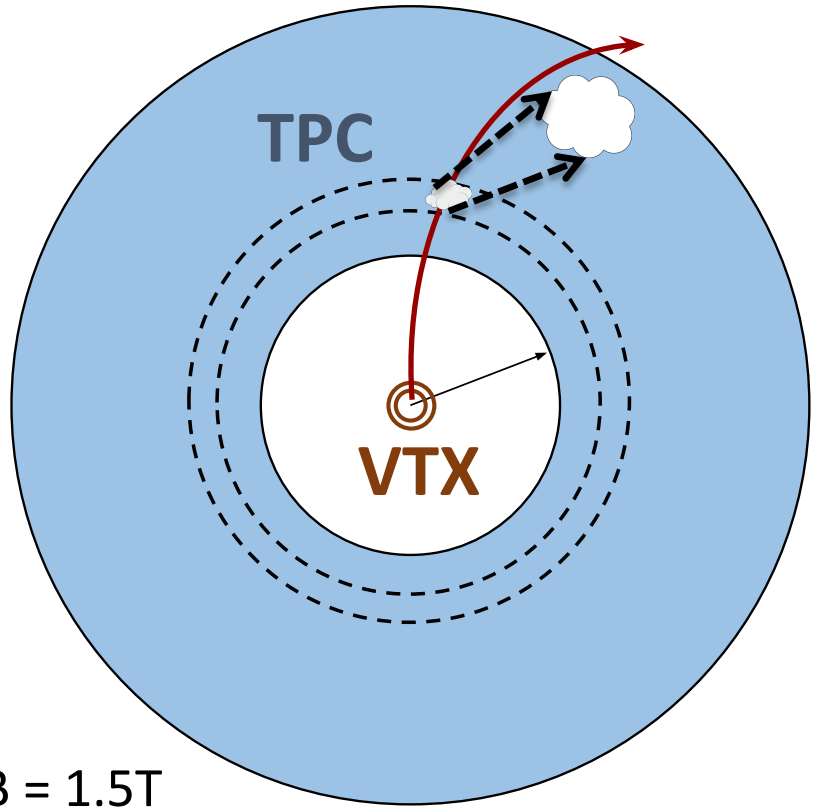
1000 single Upsilon decays
default TPC parameters

- Additional physics considerations not ruled out

TPC default parameters

A sPHENIX Tracking Solution: TPC & 2 Pixel Layers

Design parameters and performance consistent with ILC TPC prototypes



B = 1.5T

TPC

- T2K gas volume from 30cm to 80cm
- $|y| < 1 \rightarrow z_{max} \sim \pm 80$cm
- 60 radial readout layer with $\Delta r \sim 8$mm
- Readout plane with 1.2mm pads in $r\varphi$
  - approximately 350,000 readout channel
- Assume 40 MHz FADC $\rightarrow$ $\Delta z \sim 2$mm
  - approximately 400 samples per readout channel

VTX layers 1 & 2

- Silicon tracker design

- T2K gas, E=220 V/cm

TPC Simulation Plans

- Initial Optimizations to Study
  - inner radius: 20-40 cm
  - radial and azimuthal pad-size
  - gas and E-field
- TPC simulation team = Alan, Takao, Jeff, Ron, …
- Results – document in technical note and communicate to TPC project planning team (Takao, …)