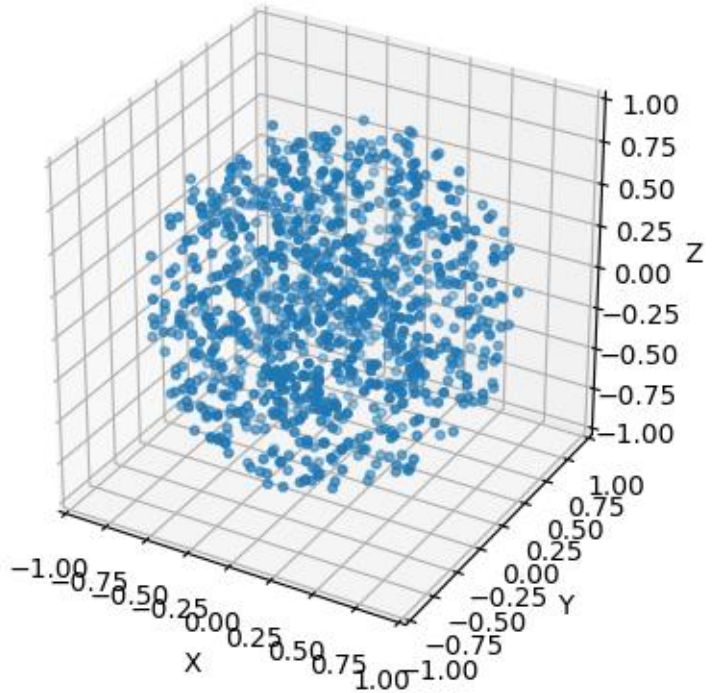
PBH Simulation

8/3/2018

Generating Random Points

- Generate uniform random distribution of ϕ, cos(θ) and $r^{1/3}$

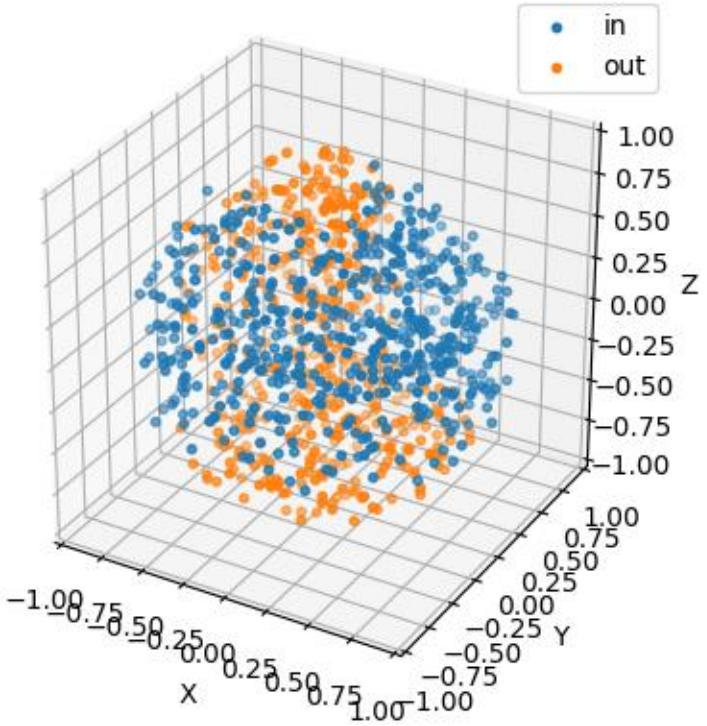


Converting to equatorial coordinates

- Assume the Earth's rotation is negligible over burst duration
- Can choose a time such that HAWC's location corresponds to a right ascension of 0h0m0s
- $\alpha = \phi$
- $\delta = 90° - \theta$
- HAWC's latitude $\approx 19°$
- $19°N = \delta \pm$ zenith distance
  - If $\delta \geq 19° \Rightarrow$ zenith distance = $\delta - 19°$
  - If $\delta < 19° \Rightarrow$ zenith distance = $19° - \delta$

HAWC's field of view

- R within 1 parsec
- α within ± 90° of HAWC
- δ ≥ -71°
- Zenith distance ≤ 50°
- Get $\sim 40\%$ of total events generated in the field of view



Next Steps

- Simulation code outputs distance, RA, dec, and zenith angle for each thrown PBH
- Use PBH spectrum to determine flux at HAWC for each event
- Use ZEBRA/LiFF to see if it would result in a detection