SciFi Pattern Recognition Efficiency

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Study Conditions

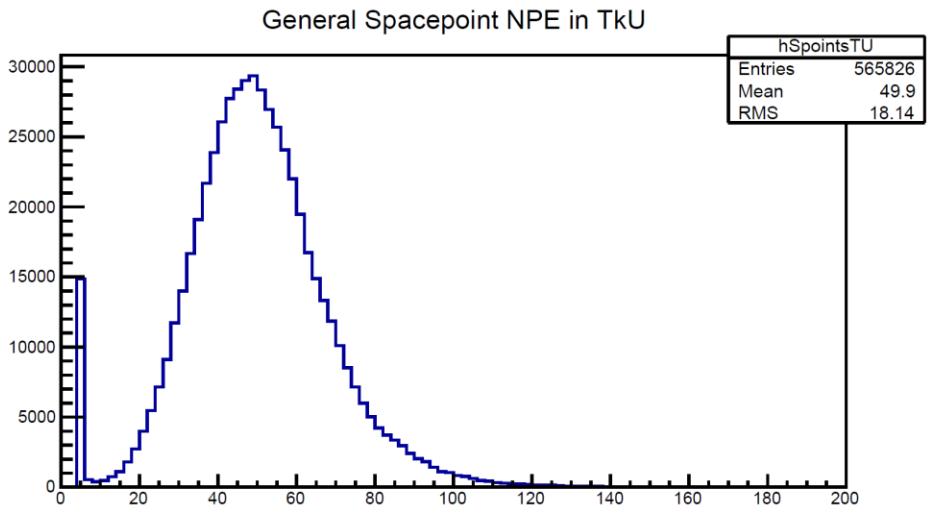
- Real data, run 8681
- Comparison of MAUS v2.6.5 and 2.7.0
- s-z chisq per dof cut of 4.0 and 24.0 respectively
- Expected track defined as:
  - 1 spacepoint and 1 only in each tracker station for tracker in question
  - 1 spacepoint and 1 only in both TOF1 and TOF2
  - Muonic time of flight
- Scattering **not** accounted for – will lower efficiency results

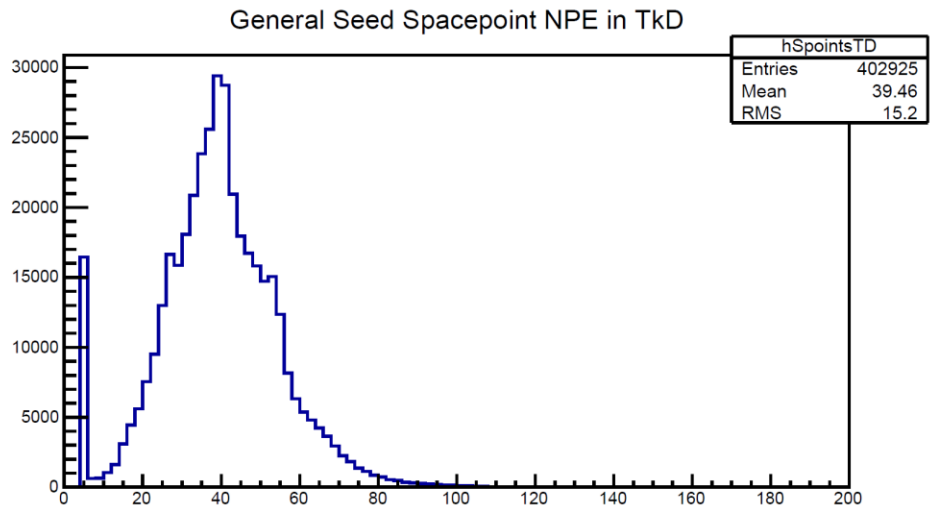
Results

Efficiency for:	**MAUS v2.6.5 (s-z cut = 4.0)**	**MAUS v2.7.0 (s-z cut = 24.0)**
TkU 5 spacepoint tracks	57.4%	87.5%
TkU 4 - 5 spacepoint tracks	91.4%	99.1%
TkD 5 spacepoint tracks	39.5%	76.3%
TkD 4 - 5 spacepoint tracks	82.7%	97.2%

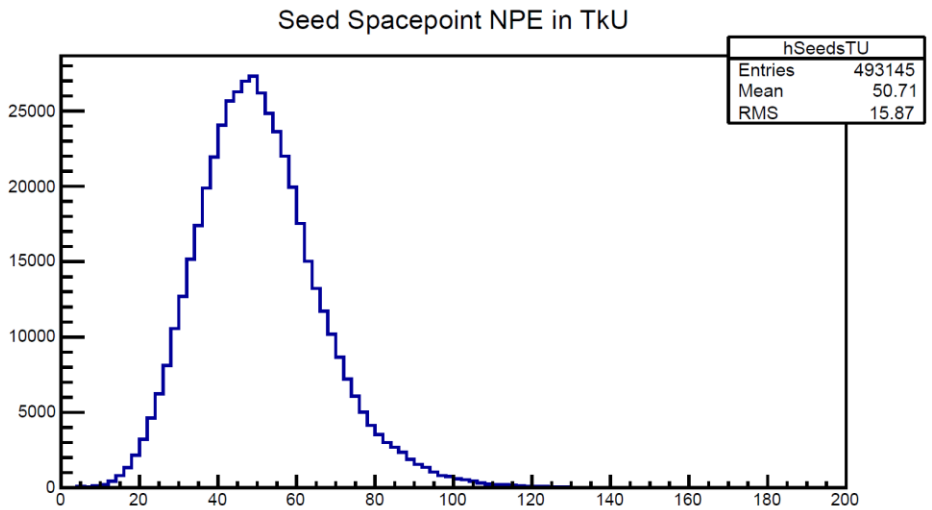
- Large increase in efficiency just by opening up the s-z chisq cut
- … but still not good enough yet
- Has the wider cut lowered performance? Unlikely – resolutions plots for an MC dataset were equivalent, maybe a touch better with the wider cut

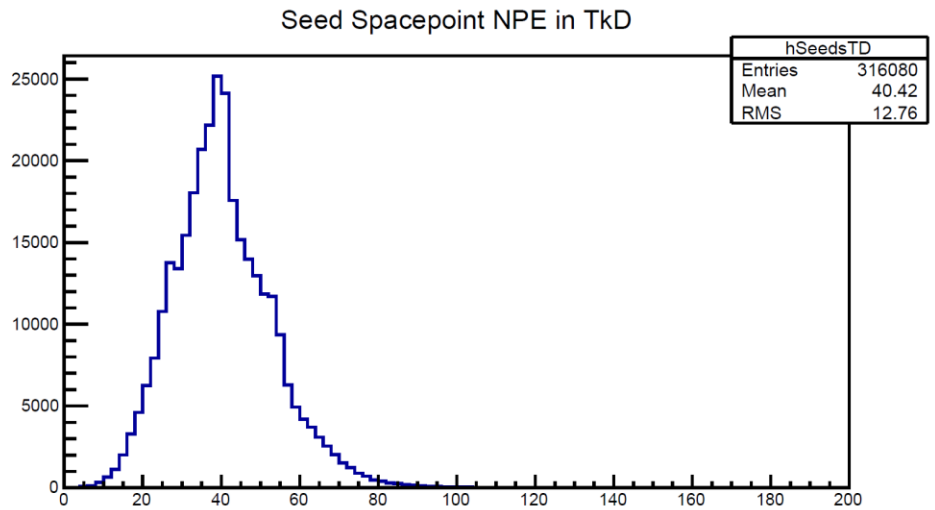
Performance with wider s-z cut





All spacepoints





Pat Rec selected spacepoints

To Do

- CMM corrections believed to be in use – check
- Review pattern recognition code, especially s-z code, look for smoking gun
- Return correct errors on pat rec parameters
  - Covariance matrix of the least sq fit for
- Check chisq distribution of fits
  - Check number of degrees of freedom used
- Look at failed events where track is expected, any common features
- Consider adding full 3D helix fit to replace s-z fit
- Think of ways to account for:
  - non-linear field
  - scattering
- Check efficiency analysis code too
- Purity analysis code would be helpful