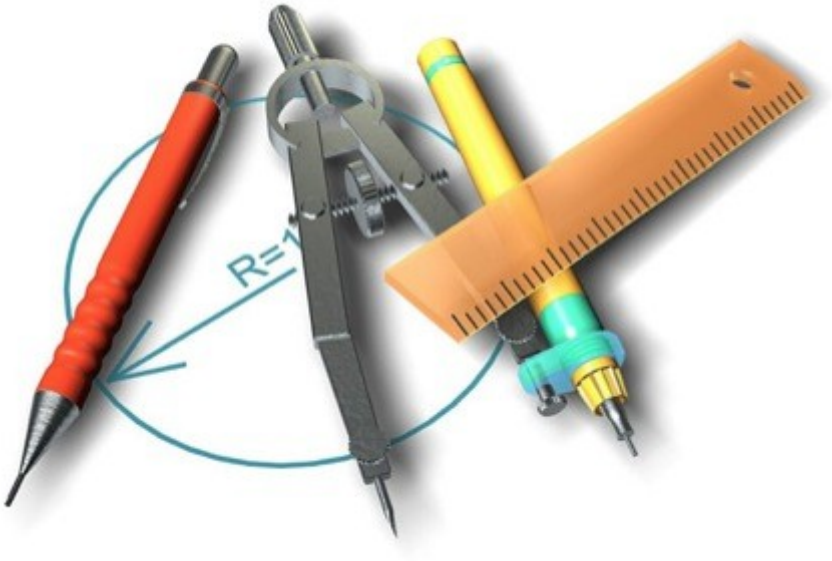
FastSim Vertexing Tools: an introduction



20/03/2012
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FastSim Vertexing Tools: an introduction

1st Part
Introduction to the Vertexing Group/Tools

2nd Part
A simple example of Vertexing

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1st Part
Introduction to the Vertexing Group/Tools

Vertexing Tools: the group

- At the moment: Gianluca Inguglia- Queen Mary, University of London
  → For any issue related to vertexing you should now refer to me (g.inguglia@qmul.ac.uk)
- April-July: G.I. + 1 undergraduate (D studies at the $\Upsilon(4S)$)
- October-March: G.I. + 1 undergraduate (vertexing)
- Someone from the audience may be interested in joining the group

Vertexing Tools: BABAR Analysis Document(s)-BAD

- **The BABAR Vertexing: BAD n.102**
- **Vertexing supporting document for Summer 2001 Conferences: BAD n.254**
- **Beamspot determination and use in BABAR: BAD n.013**
- **http://mailman.fe.infn.it/superbwiki/index.php/FastSimDoc/VertexingUserGuide**

Vertexing Tools: BABAR Analysis Document(s)-BAD

- **The BABAR Vertexing: BAD n.102**
  - **Vetexers/fitters algorithms, Δz algorithm, etc.**
- **Vertexing supporting document for Summer 2001 Conferences: BAD n.254**
  - **Additional documents for quality monitoring (BS, TagMix/CP evts comparison, etc.)**
- **Beamspot determination and use in BABAR: BAD n.013**
  - **Documents for BS studies.**
- **http://mailman.fe.infn.it/superbwiki/index.php/FastSimDoc/VertexingUserGuide**
  - **Vertexing User Guide migrated by Matteo Rama from BABAR. There are few no-working web-links. Once I obtain a BABAR password to access the documentation I will fix these problems.**

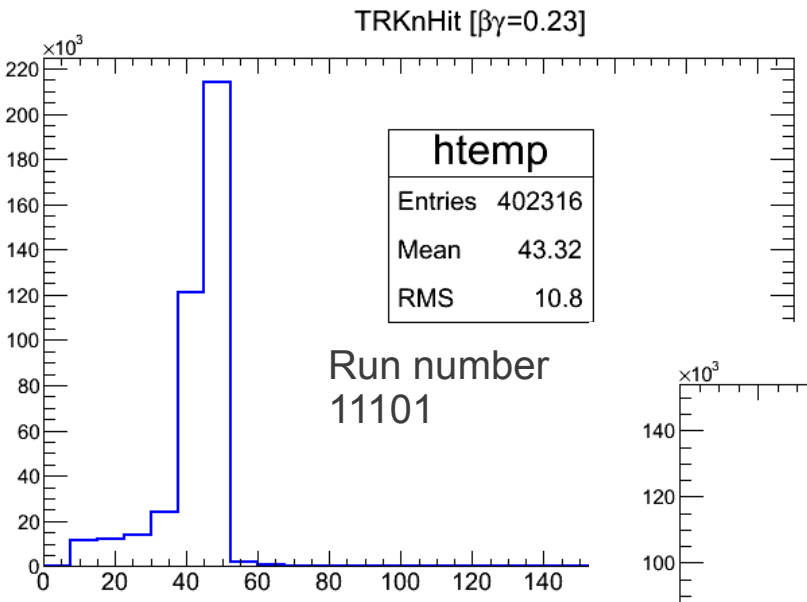
Vertexing Tools: aims..

- Perform systematic studies of the vertexing issues for both $\Upsilon(4S)$ and $\Psi(3770)$ run
- Evaluate performances of different Vertexers/Fitters for both $\Upsilon(4S)$ and $\Psi(3770)$ run
- For the run at the $\Psi(3770)$ evaluate vertexing performances for different boost configurations
- Keep up-to-date documentation: wiki, “BAD”..
- Open to new proposals/suggestions

FastSim Vertexing Tools: an introduction

2nd Part
A simple example of Vertexing
(all preliminary results)

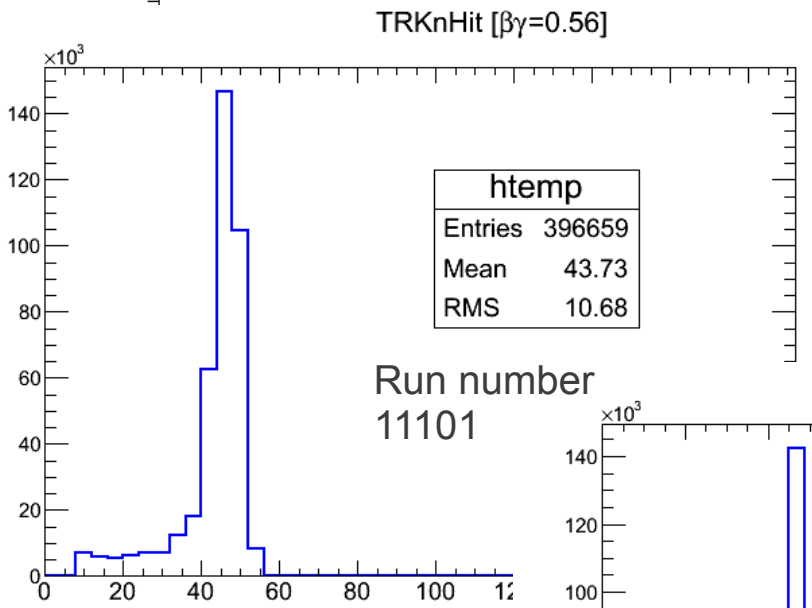
Total number of hits

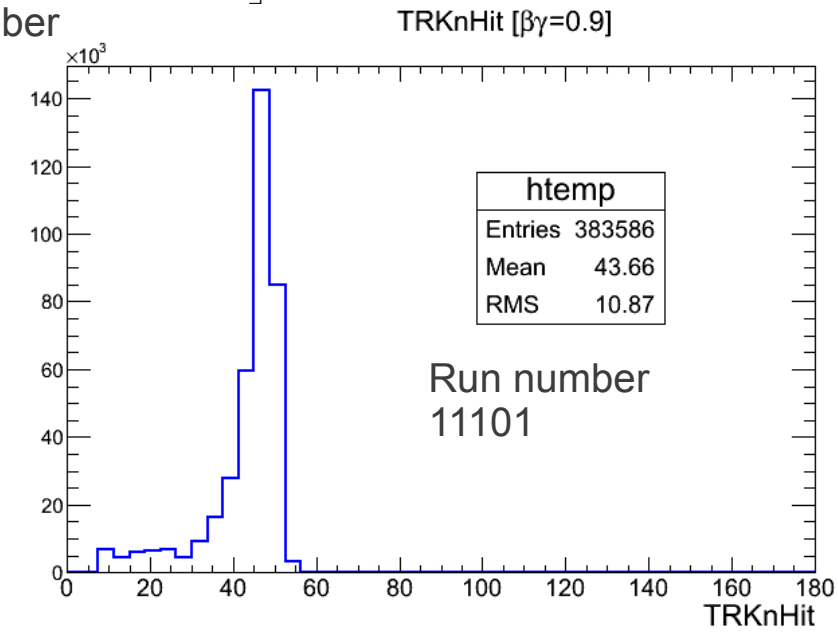


$e^+e^- \to \Psi'' \to D^0\ \overline{D^0} \to \pi^+\pi^-\ K^+K^-$

BOOST →

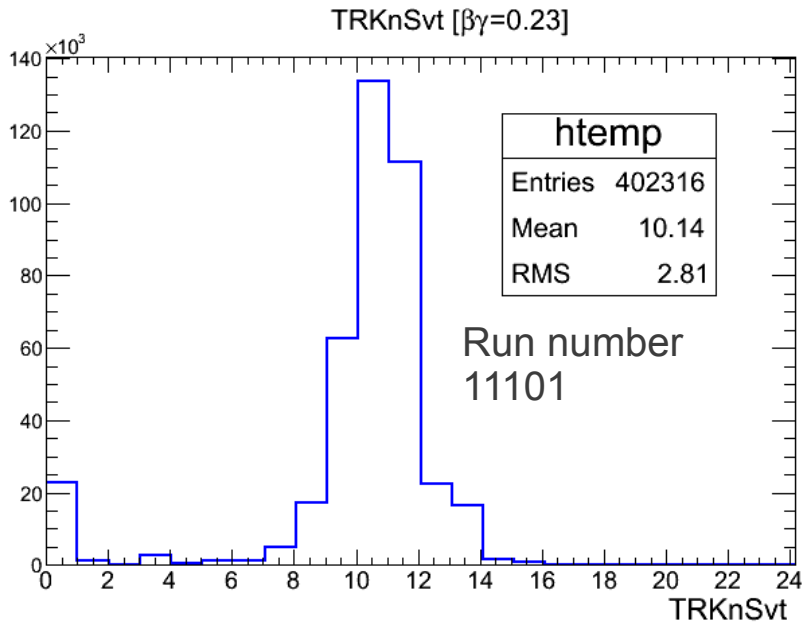
Same events are generated with a different βγ factor





Number of entries decreases by ~1.5% when the boost is increased βγ=0.23 to βγ=0.56, and by ~5% when it is increased from βγ=0.23 to βγ=0.9

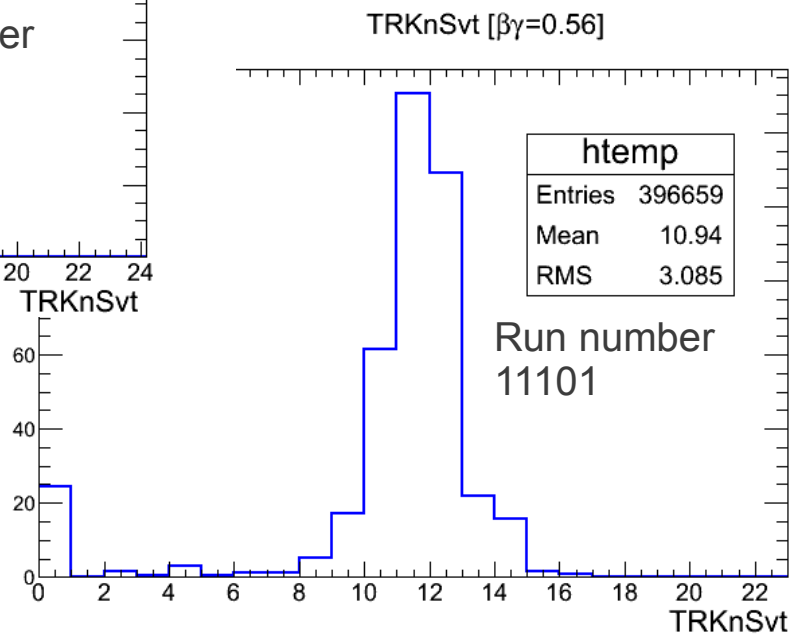
Tracks number in the SVT

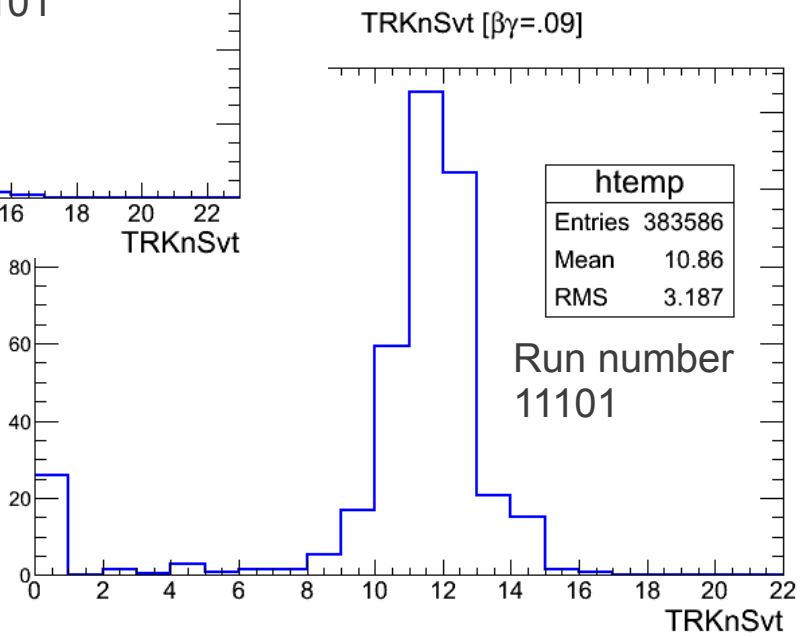


$e^+e^- \to \Psi'' \to D^0\ \overline{D^0} \to \pi^+\pi^-\ K^+K^-$

BOOST →

Same events are generated with a different βγ factor





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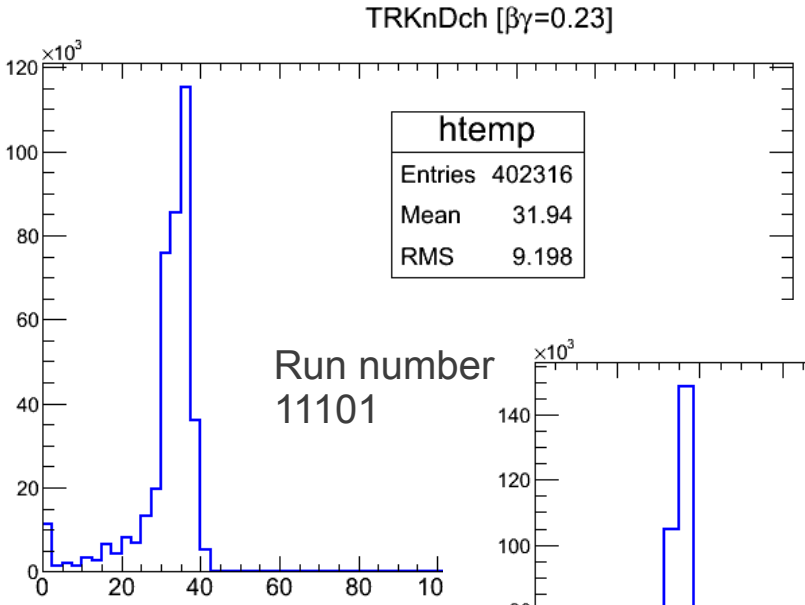
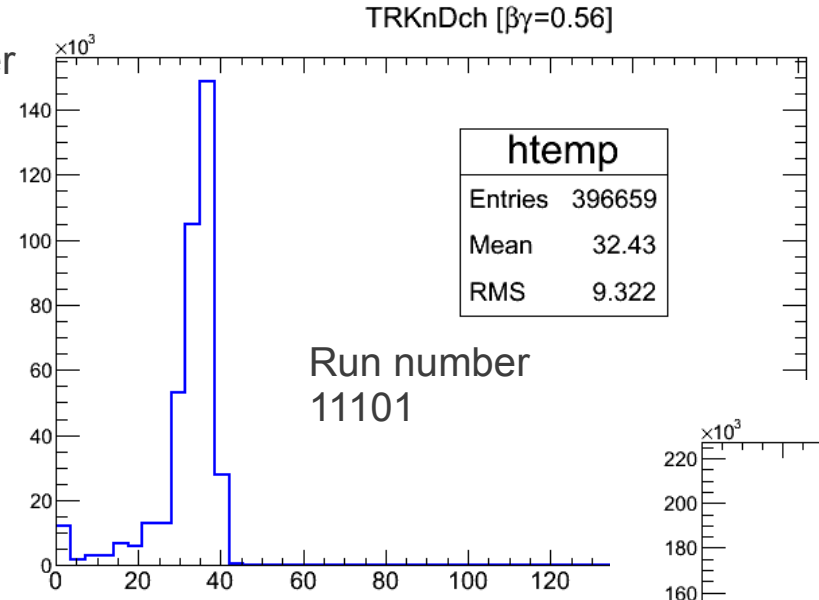
Tracks number in the Dch

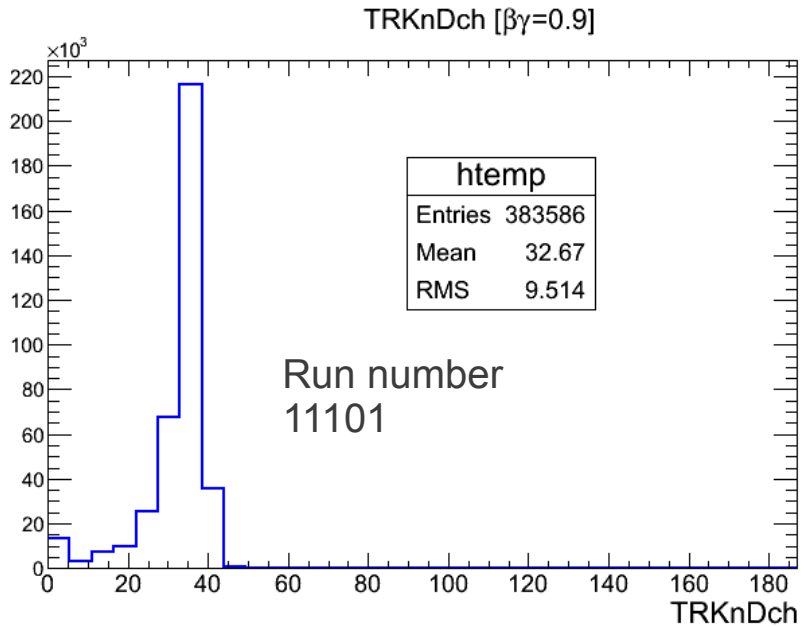




$e^+ e^- \to \Psi'' \to D^0 \ \overline{D^0} \to \pi^+ \pi^- \ K^+ K^-$

BOOST →

Same events are generated with a different βγ factor



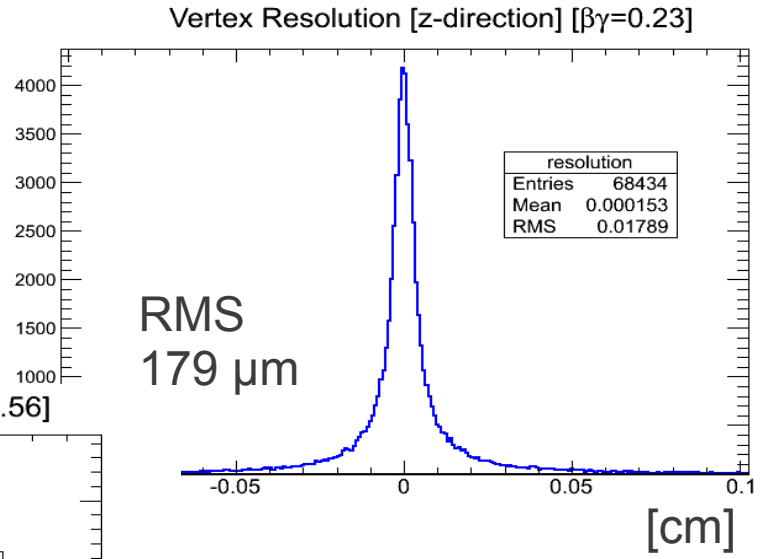
Number of entries decreases by ~1.5% when the boost is increased βγ=0.23 to βγ=0.56, and by ~5% when it is increased from βγ=0.23 to βγ=0.9

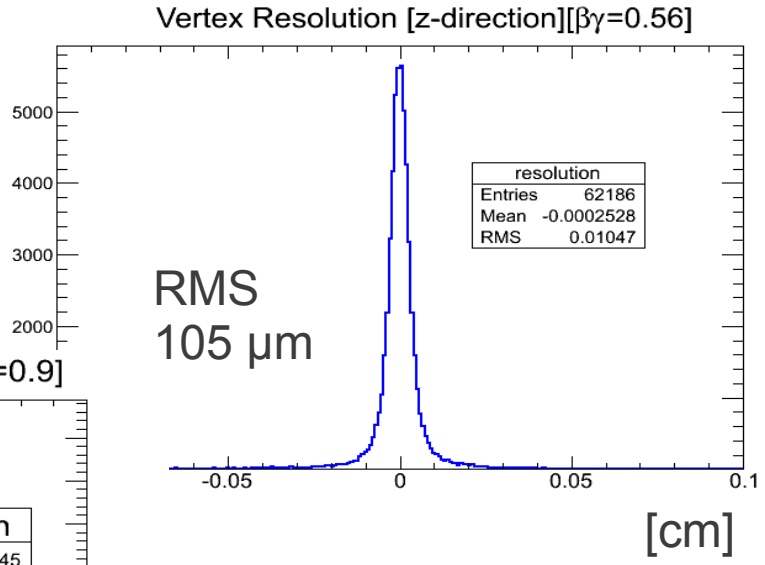
Vertex resolution (z-direction only)

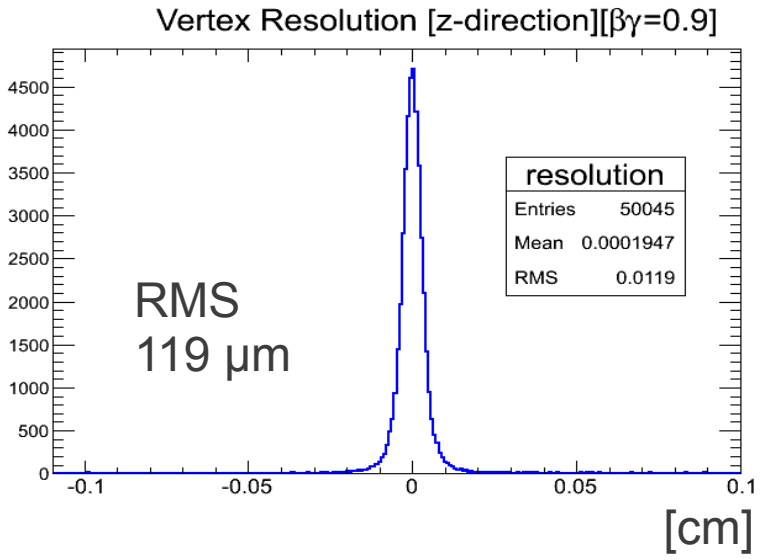
$$e^+ e^- \to \Psi'' \to D^0 \quad \overline{D^0} \to \pi^+ \pi^- \quad K^+ K^-$$

Same events are generated with a different βγ factor

BOOST







Note: loose cuts are applied, but still only signal is generated!

RMS decreases when the boost is increased from βγ=0.23 to βγ=0.56 , however from βγ=0.56 to βγ=0.9 the RMS value slightly increases.

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Conclusions

- The “Vertexing Group” exists and is already actively working
- More results will be available at the next meeting in Elba
- Do not hesitate to contact me for any suggestion/requirement
- Man power required, do not hesitate to contact me and join the group

...Many Thanks...