Subject: how to convert kinematic variables from lab frame to cm frame in root
Posted by Ajay Kumar on Mon, 03 Jun 2013 06:56:10 GMT
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Hello everyone,

I know the Theta distribution of two body decay reaction in the laboratory frame.I need to convert Theta_lab distribution in to Theta_CM distribution for my analysis.
For this , I have searched in the ROOT user guide but unfortunately I could not see any functionality there for that.

How to convert different kinematic variables from lab frame to cm frame using root?

Is there any functionality available in root for this conversion?

Thanks

Subject: Re: how to convert kinematic variables from lab frame to cm frame in root
Posted by Ralf Kliemt on Mon, 03 Jun 2013 07:32:17 GMT
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Hello,

There are two situations:

A) If you do analysis, there is the
RhoBooster class which helps transforming the particle candidates between LAB and CM.

B) You use TLorentzVector: There is the possibility to boost it with the CM momentum.
(see also http://root.cern.ch/root/html534/TLorentzVector.html)

Cheers.
Ralf

Subject: Re: how to convert kinematic variables from lab frame to cm frame in root
Posted by Stefan Pflueger on Mon, 03 Jun 2013 13:19:27 GMT
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Hi Ajay,

just a small remark: I also had to calculate this for lmd fitting. However my function calculates the 4 momentum transfer from the theta angle in the lab frame. You can see it here

http://cbmroot.gsi.de//panda_doc/daily/html/classPndLmdDPMAngModel1D.html#ab105732897c38a7fa0aaf679dcb2bd11

Maybe this is of some use..

Best regards,

Stefan

Subject: Re: how to convert kinematic variables from lab frame to cm frame in root
Posted by StefanoSpataro on Mon, 03 Jun 2013 17:31:02 GMT
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This means that, if you have a collision along z axis, you can calculate the beta of the center of mass (betacm), and transform one TLV from lab to cm you have just to do:

tlv_lab.Boost(0., 0., betacm);

Subject: Re: how to convert kinematic variables from lab frame to cm frame in root
Posted by Ajay Kumar on Tue, 25 Jun 2013 07:18:03 GMT
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Dear All,

Thanks to all of you.
I have boosted Lambda and AntiLambda from lab to cm frame using TLorentzVector.
I have attached macro here.Please see it once,

Am I doing correct ?
Please help me.

Thanks

File Attachments
1) run_labcm_conversion.C, downloaded 588 times

Subject: Re: how to convert kinematic variables from lab frame to cm frame in root
Posted by StefanoSpataro on Tue, 25 Jun 2013 08:20:04 GMT
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No, it is not correct.
First of all, you have to calculate the betacm from the initial particles (the target proton at rest and the projectile antiproton), and not from the supposed reconstructed lambdas.
Second, if your CM is traveling at betacm, in order to have the coordinates in the CM frame

you have to boost them of -betacm.