Subject: URGENT: geane - coordinate system Posted by Sebastian Neubert on Thu, 27 Sep 2007 12:09:32 GMT View Forum Message <> Reply to Message

Hi!

The geane coordinate system is different from the panda coordinate system. In geane the beam is going along x: $(x,y,z) \rightarrow (z,y,-x)$

Why is this so? In principle GEANE does not need the information of the beam axis. All relevant information is in the geometry and the field. Both data sets are available in the panda coordinate system. Where are they converted?

Using two different coordinate system creates a mess in the tracking.

Regards, Sebastian.

Subject: Re: URGENT: geane - coordinate system Posted by Sebastian Neubert on Thu, 27 Sep 2007 12:56:16 GMT View Forum Message <> Reply to Message

Furthermore I am a bit puzzled about TrackParP. Andrea you said this would be (q/p, v, w, v', w'). In the code Mohammad made a comment which says: (v, w, v', w', q/p)

Now what is right? How are the covariances ordered?

Cheers! Sebastian.

Subject: Re: URGENT: geane - coordinate system Posted by Andrea Fontana on Thu, 27 Sep 2007 13:46:48 GMT View Forum Message <> Reply to Message

Hi Sebastian,

the reason why the geane system is with beam along x axis is, as far as I know, historical and we had adopted this convention to properly call geane. We can perhaps think of a different approach, but in all our tests it did not seem necessary so far. Regarding CbmTrackParP, I think the comment is not correct: all the calculations in SD are internally done with the convention (q/p,v',w',v,w). See for instance the calculation of the covariance matrix in SD, where we write:

fDQp = TMath::Sqrt(fabs(fCovMatrix[0])); fDTV = TMath::Sqrt(fabs(fCovMatrix[5])); fDTW = TMath::Sqrt(fabs(fCovMatrix[9])); fDV = TMath::Sqrt(fabs(fCovMatrix[12])); fDW = TMath::Sqrt(fabs(fCovMatrix[14]));

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See also our report for the SD definition. Hope this helps.

Ciao, Andrea

Subject: Re: URGENT: geane - coordinate system Posted by Andrea Fontana on Thu, 27 Sep 2007 13:49:16 GMT View Forum Message <> Reply to Message

Dear all,

regarding the comments in geane and trackbase, I am working on them. Some are obsolete and need to be removed.

Andrea

Subject: Re: URGENT: geane - coordinate system Posted by Lia Lavezzi on Thu, 27 Sep 2007 14:04:43 GMT View Forum Message <> Reply to Message

Hi Sebastian,

concerning the beam direction and the coordinate difference, the particle direction is along the x axis in the transverse (curvilinear) frame, the so called SC: you can always change the reference system from the SC to the master reference system using the function FromSCToMars in CbmGeaneUtil.

Hope this helps.

Ciao, Lia.

Subject: Re: URGENT: geane - coordinate system Posted by Andrea Fontana on Thu, 27 Sep 2007 14:09:08 GMT View Forum Message <> Reply to Message

Hi again,

Lia and I just had a brief discussion on this thread and we believe that in some cases the transformation $(x,y,z) \rightarrow (z,y,-x)$ that we tried at GSI the other day works correctly, but it is not general. The correct way to transform is the FromSCToMars suggested by Lia: in this way the transformation between the two systems is properly taken into account. Subject: Re: URGENT: geane - coordinate system Posted by Sebastian Neubert on Thu, 27 Sep 2007 15:17:01 GMT View Forum Message <> Reply to Message

Hi!

I will think about the (x,y,z)->(z,y,-x) transformation again. However we do not need (and I do not use) SC (at the moment). Only SD and in this case there is no need to have any one distinguished axis.

My question is: where is the transformation done for the Geometry and the Field?

Anyhow - I am working on GeaneTrackRep to hide all this.

Sebastian.

Subject: Re: URGENT: geane - coordinate system Posted by Andrea Fontana on Thu, 27 Sep 2007 15:32:59 GMT View Forum Message <> Reply to Message

Hello Sebastian,

we do not understand exactly why a transformation should be done for the geometry and the field.

In CbmTrackParP the track is defined in the SD system with a detector plane defined by the user: the track parameters and the errors are calculated on this plane but the tracking internally (in ERTRAK) is done always in MARS. So there is no need to transform geometry and field.

Perhaps we did not understand your question: if our reply is not satisfactory, can you please add more details to your question?

Andrea and Lia

Subject: Re: URGENT: geane - coordinate system Posted by Sebastian Neubert on Thu, 27 Sep 2007 15:38:00 GMT View Forum Message <> Reply to Message

Hi!

My question is only this: Are the coordinates of our geometry transformed in geane? Probably not. So why do we have to do the trafo at all? The only reason would be, that we want the SC angles to be meassured with respect to the beam, right?

Subject: Re: URGENT: geane - coordinate system Posted by Andrea Fontana on Thu, 27 Sep 2007 16:00:15 GMT View Forum Message <> Reply to Message

Hello,

there is no coordinate transformation: geane tracks in MARS. The only transformations are in the definition of the track parameters and in their errors calculation: these can be done in SC or SD and can be transformed in MARS after the tracking. At this point MARS for geane is identical to MARS for Panda.

In the first tutorial we shot along x axis, but it was only to keep things simple: in the second tutorial we shot isotropically in the Panda (MARS) system, so there is nothing special about x axis. In SC angles are already defined in MARS as azimuthal and polar angles. If the track is in SD you have to calculate them by transforming to SC.

We hope this is clear now.

Ciao, Andrea and Lia

Subject: Re: URGENT: geane - coordinate system Posted by Sebastian Neubert on Fri, 28 Sep 2007 09:40:04 GMT View Forum Message <> Reply to Message

Hi!

Ok. Very good! Thank you for the clarification. So we do not need to bother with any transformation, because all that is needed is already in TrackParP.

Cool! Sebastian.

Subject: Re: URGENT: geane - coordinate system Posted by Sebastian Neubert on Fri, 28 Sep 2007 12:17:31 GMT View Forum Message <> Reply to Message

Hi!

I have look into CbmTrackParP and I found the place where the confusion sets in:

TVector3 positionsd = util.FromMARSToSDCoord(TVector3(fX, fY, fZ), forigin, fiver, fjver,

fkver);

fU = positionsd.X(); // CHECK fV = positionsd.Y(); // CHECK fW = positionsd.Z(); // CHECK

Since fV and fW are used in the trackrepresentation it is implicately assumed, that X is along the track. So it has indeed nothing to do with the beam-axis.

In other words:

I would like to have: pos=(1,1,0) mom=(0.1,0,1) in MARS

when being projected onto a plane o(0,0,0) u(1,0,0) v(0,1,0)

to give v=1; w=1; v'=0.1; w'=0;

this is currently not the case because of the code shown above. instead one would get u=1; v=1; u'=0.1; v'=0;

In principle we should use fU and fV or build in some conversion somewhere. Still thinking about it....

Cheers! Sebastian.

Subject: Re: URGENT: geane - coordinate system Posted by Sebastian Neubert on Fri, 28 Sep 2007 12:23:23 GMT View Forum Message <> Reply to Message

Hi!

So understood some more.

The problem is that I interpret my DetPlane different than the geane-convention.

I always think that the detectorplane is spanned by x and y (which could be rotated to u and v).

In Geane v,w (corresponding to y,z) of the plane are assumed to span the plane.

•••

Subject: Re: URGENT: geane - coordinate system

Hi!

Ok. It works. Sorry for the confusion! There will be demo with the GeaneTrackRep in Action soon.

Cheers and have a nice Weekend! Sebastian

Subject: Re: URGENT: geane - coordinate system Posted by Sebastian Neubert on Fri, 28 Sep 2007 14:05:49 GMT View Forum Message <> Reply to Message

Hi!

In recotasks/demo

there is a demo scipt which shows how the GeaneTrackRep and a DemoRecoHit are used to caluclated residuals.

Cheers! Sebastian.

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