

From: Heather Kelly <heather625@gmail.com>
Subject: **Re: blanket estimate**
Date: April 26, 2006 12:37:13 PM EDT
To: Dave Thompson <djt@egret.gsfc.nasa.gov>, "Bill Atwood" <atwood@scipp.ucsc.edu>, "Steve Ritz" <steve.ritz@nasa.gov>, "Bogart, Joanne" <jrb@slac.stanford.edu>, "Dubois, Richard" <richard@slac.stanford.edu>
Cc: "Dave Thompson" <djt@bartok.gsfc.nasa.gov>, "Alexander Moiseev" <moiseev@milkyway.gsfc.nasa.gov>, Bob Hartman <rch@blazar.gsfc.nasa.gov>

Ok, so I think the next step is to find some time for Joanne to implement the new volumes for the crown. When do we need this in? Richard mentioned we would like to have the model updated in time for the next round of background runs - do we have a date in mind?

Take care,
Heather

At 06:21 AM 4/26/2006, Dave Thompson wrote:

Bill et al.,

I have looked at Heather's confluence page. It certainly looks reasonable. Heather has done a nice job. I did not check every number, but I can confirm that the documents she used are the current ones that I supplied. They reflect the as-built configuration of the ACD MMS/MLI.

Bill's concerns echo the ones we have had since the beginning of the project - the materials outside the scintillator are a source of background. The positron contribution is one we had not anticipated.

FYI, the 0.26 g/cm² number that Bill mentions comes from a 1999 "first guess" that I made for the MMS/MLI thickness. That number, as far as I can tell, has never been part of any simulations. The older ACD blanket page uses a later estimate of 0.295 g/cm². Our signed-off Level IV requirement was 0.32 g/cm². We submitted a CR for the final number of 0.39 g/cm². That number is the one Mizuno used in his recent calculation that appears on the Analysis Group Web page for the 17 April meeting.

The MMS/MLI design was optimized within competing requirements, principally the desire for low mass vs. the need for reliability against micrometeoroid penetration. The biggest driver for a larger mass was the re-evaluation of the orbital debris flux to reflect the real environment in which LAT will fly.

Dave Thompson

At 04:59 PM 4/25/2006, Bill Atwood wrote:

Hi Richard et al -

I've looked a bit through Heather's work and as usual quite thorough and well done. However this raises new concerns. If I take it at face value the grammage will increase from ~ .26 gr/cm² to ~ .39 gr/cm² or an increase of ~ 44%. The numbers I had in my head were .39 gr/cm² (LAT) and .18 gr/cm² (EGRET). However it seems that the LAT number was low due to the density being incorrect (densities are hostile to the thickness which is 32.7 mm according to the Confluence page and I'm assuming this hasn't changed...). Our residual backgrounds for "Class A" events are about 70% irreducible (e+ conversions and proton interactions mostly in the blanket) and compared to the EGD above 100 MeV ~ 30% (the science req. is 10% - but with the current blanket there is no way to meet this). The new numbers will definitely move these both up substantially. So Alex M., Dave T. and Bob Hartman (don't have his e-mail address) should go to the Confluence page and bless and the numbers. That's the check and sign-off I want.

- Bill

----- Original Message ----- From: "Dubois, Richard" <richard@slac.stanford.edu>
To: "Heather Kelly" <heather625@gmail.com>; "Bill Atwood" <atwood@scipp.ucsc.edu>; "Bogart, Joanne" <jrb@slac.stanford.edu>; "Steve Ritz" <steve.ritz@nasa.gov>
Sent: Tuesday, April 25, 2006 1:01 PM
Subject: RE: blanket estimate

Note that Joanne's first priority these days is to MOOT (LAT configuration), so her help needs to be scheduled ahead of time! So early feedback on this would be appreciated...

Richard

-----Original Message-----

From: Heather Kelly [mailto:heather625@gmail.com]

Sent: Monday, April 24, 2006 12:47 PM

To: Bill Atwood; Bogart, Joanne; Steve Ritz; Dubois, Richard

Subject: blanket estimate

Hi,

I've made a first guess at the changes involved in moving to a more realistic blanket. The details are available on the confluence page:

<https://confluence.slac.stanford.edu/display/ACD/Thermal+Blanket>

Here are some highlights.. the density of the material for the blanket is greater than what is currently in the model - we have 0.08 g/cm³, and in reality it looks to be 0.12 g/cm³ or 0.13 (depending if we're referring to the top or sides of the MMS/MLI)...there are two additional layers of Kevlar on the sides.

The dimensions will change slightly..but more importantly the distance between the blanket and the tiles could be adjusted rather dramatically for the top tiles if we implement the crown of the blanket as it exists. Currently we model a box for each "side" of the blanket - so the distance between the top tiles and the blanket are a bit larger by the size of the ACD tile crown - than reality. With the addition of some more boxes, we could model the blanket crown as well - I just don't know if we have enough Joanne-time to do that.

I took a swing at determining the composition for a new catch-all material for the blanket...and for all intents and purposes the material looks about the same for the top and side calculations so I have some amount of belief in the numbers .. my chemistry might be rusty..I haven't thought about moles except the ones in the back yard in a while..so feel free to check :) The radiation lengths will be determined at run time by the G4 material class - it would be quite handy to see what it calculates based on this new composition, from that we could get a good sense if that material really is in the ballpark... I should probably figure a radiation length based on a weighted average of the compounds in the material...

Comments..thoughts....

Take care,
Heather