

## Update on light nucleus corrections

*W.J. Llope*

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- absorption
  - use pbar cross-sections + integrated material thickness for dbar & tbar, scale pbar
- p & pbar feeddown
  - starsim + bfc simulations...
- reconstruction efficiency
  - embedding
  - low priority (not QM request), plus problem: Ticket #2097

see also [59]). In the relevant momentum region, the total cross section can be described as a function of the antiproton laboratory momentum  $p$  by

$$\sigma_{total}(\bar{p}p) = 120 p^{-0.65} \text{mb.} \tag{6.6}$$

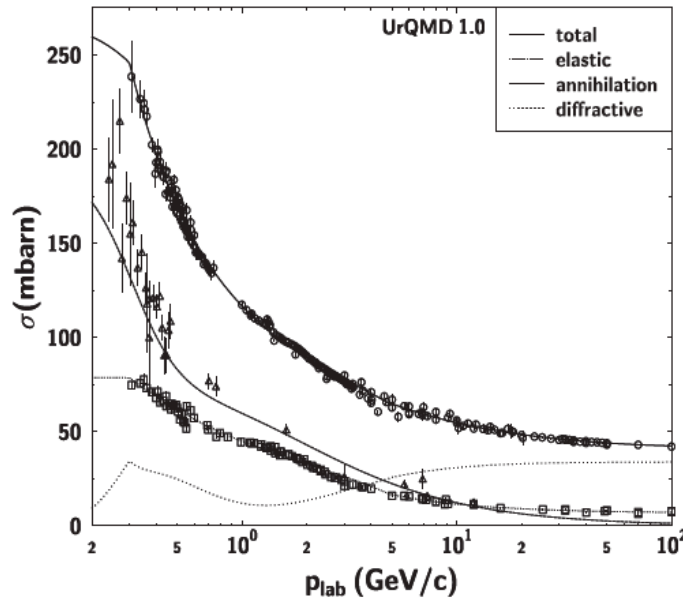


Figure 6.14: Antiproton/proton total, elastic and annihilation cross section. Lines show the parametrizations used in UrQMD [58].

The transverse nucleon density  $\rho_t$  is extracted from a fit to the simulation. From this, the antiproton absorption loss correction for the year 2001 data was calculated,

$$abs_{corr}^{\bar{p}}(p) = \exp\left(\frac{0.089}{\sqrt{1+\gamma}} p^{-0.65} \frac{p}{\rho_t}\right). \tag{6.7}$$

...for light nuclei, scale exponent  
 $\sigma_{inel}(d, {}^3\text{He}) \approx (\sqrt{2}, 2)\sigma_{inel}(p).$

↖ or triton

and evaluate  $p$  at  $P_T/A$

and scale exponent to account for new material since Run-1...

Run 2001 has inner detector SVT while Run 2010 doesn't. But TOF is used in this analysis, which means anti He3 and anti He4 should go through all TPC gas, outer field cage and about half TOF in case to be measured. Using the thickness (in radiation lengths) of different structures in STAR, which can easily be found from according detector documents:

beam pipe 0.21 %

SVT 4.5 %

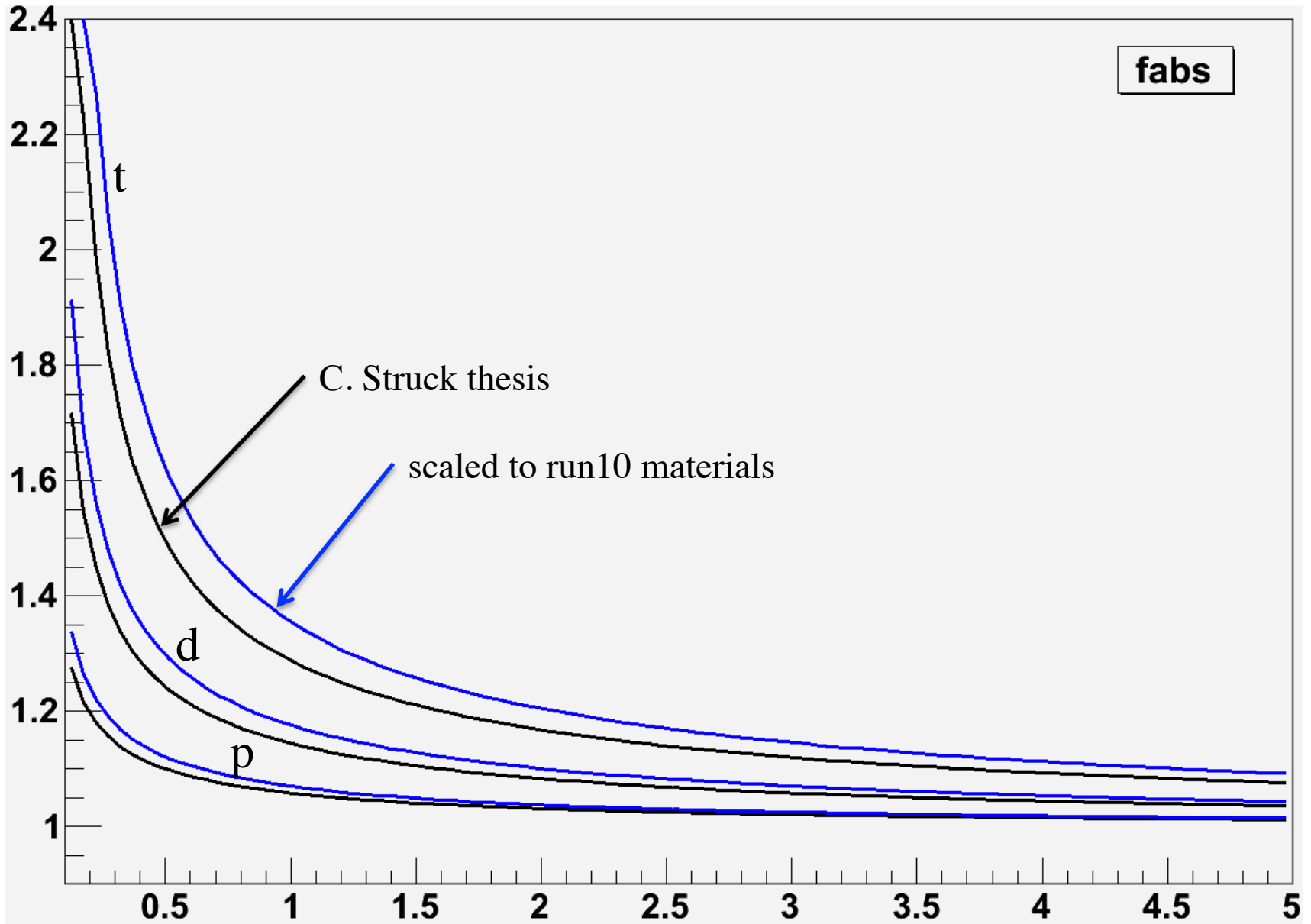
insulating gas and TPC inner field cage 0.65 %

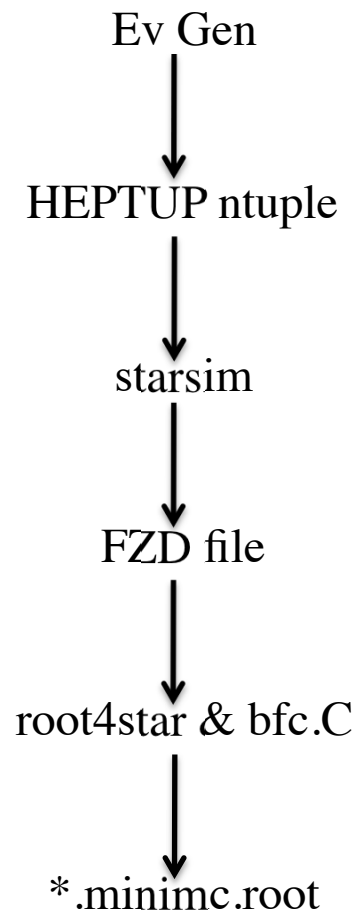
TPC gas and outer field cage 2.43 %

TOF 6 %

We can get a rough thickness ratio between Run 2010 using TPC + TOF and Run 2001 using TPC only as  $(0.21+0.65+2.43+6./2)/(0.21+4.5+0.65) = 1.2$ . Using this ratio we obtain the absorption correction factor for Run 10 using TOF below.

from antialpha paper docs...





Hijing 3.82  
UrQMD 3.3p1  
Pythia 6.409

simply updated Makefile  
compiled locally, HEPTUP routines added  
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Y2009 geometry

working with Victor to get impact parameter into MiniMcEvent  
see ticket #2111 for present status  
in the meantime, just throw top 10% central events ( $b < 4.43\text{fm}$ )

chain options:

```

trs y2009 Idst IAna 10 tpcI fcf McEvOut MiniMcMk Tree logger
ITTF Sti VFPPV NoSvtIt NoSsdIt bbcSim btosim tags emcY2 EEfs
evout -dstout IdTruth geantout big fzin eemcDb beamLine clearmem
  
```

require  $|y| < 0.5$  and global DCA  $< 1$  cm

