Background Flux Model Update

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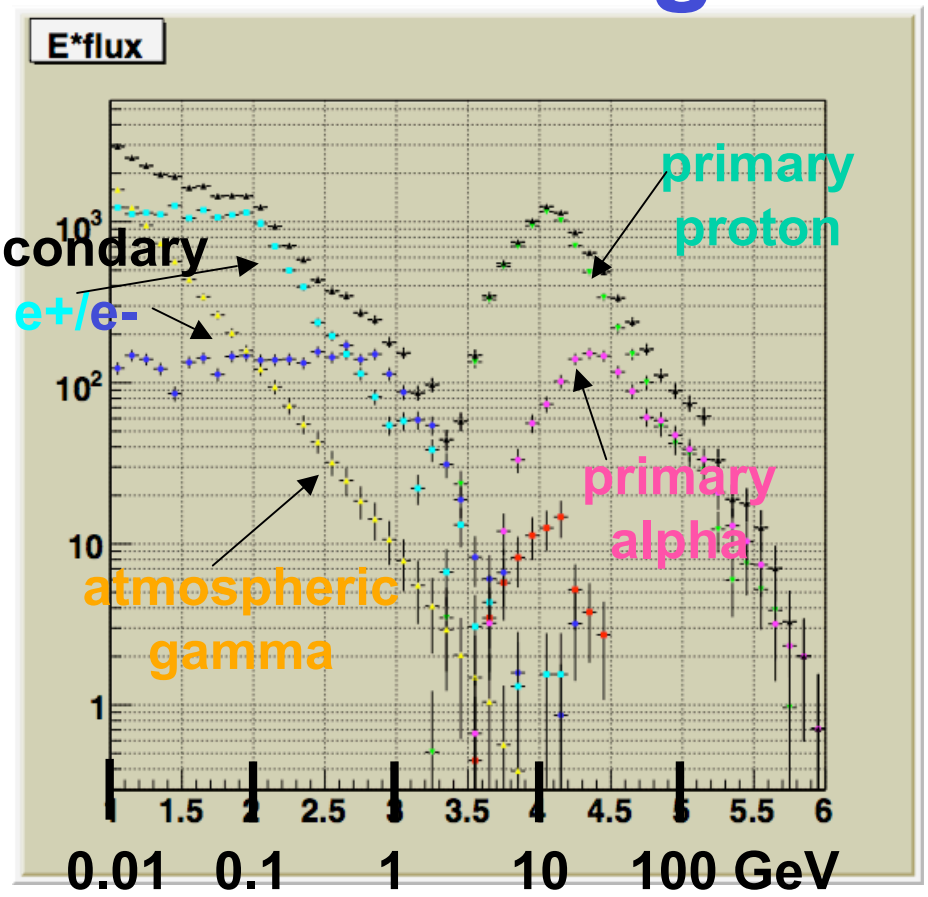
On behalf of the Background flux review team

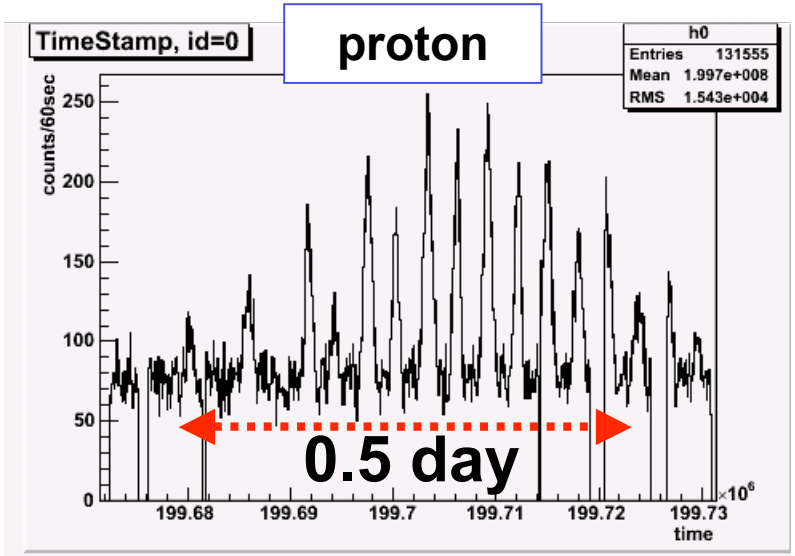
(lead by Jonathan Ormes)

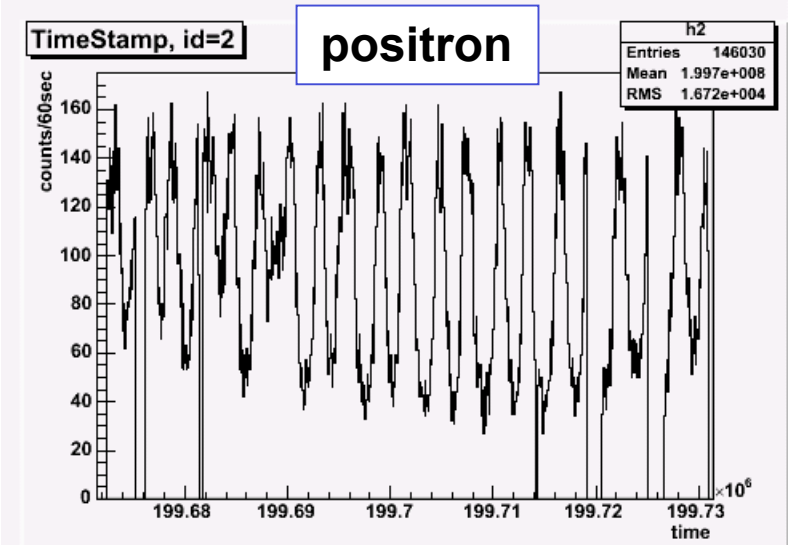
Confluence page:
https://confluence.slac.stanford.edu/display/SCIGRPS/Background+Flux+Review

DC2 Background Flux Model



From Toby's talk at DC2 workshop



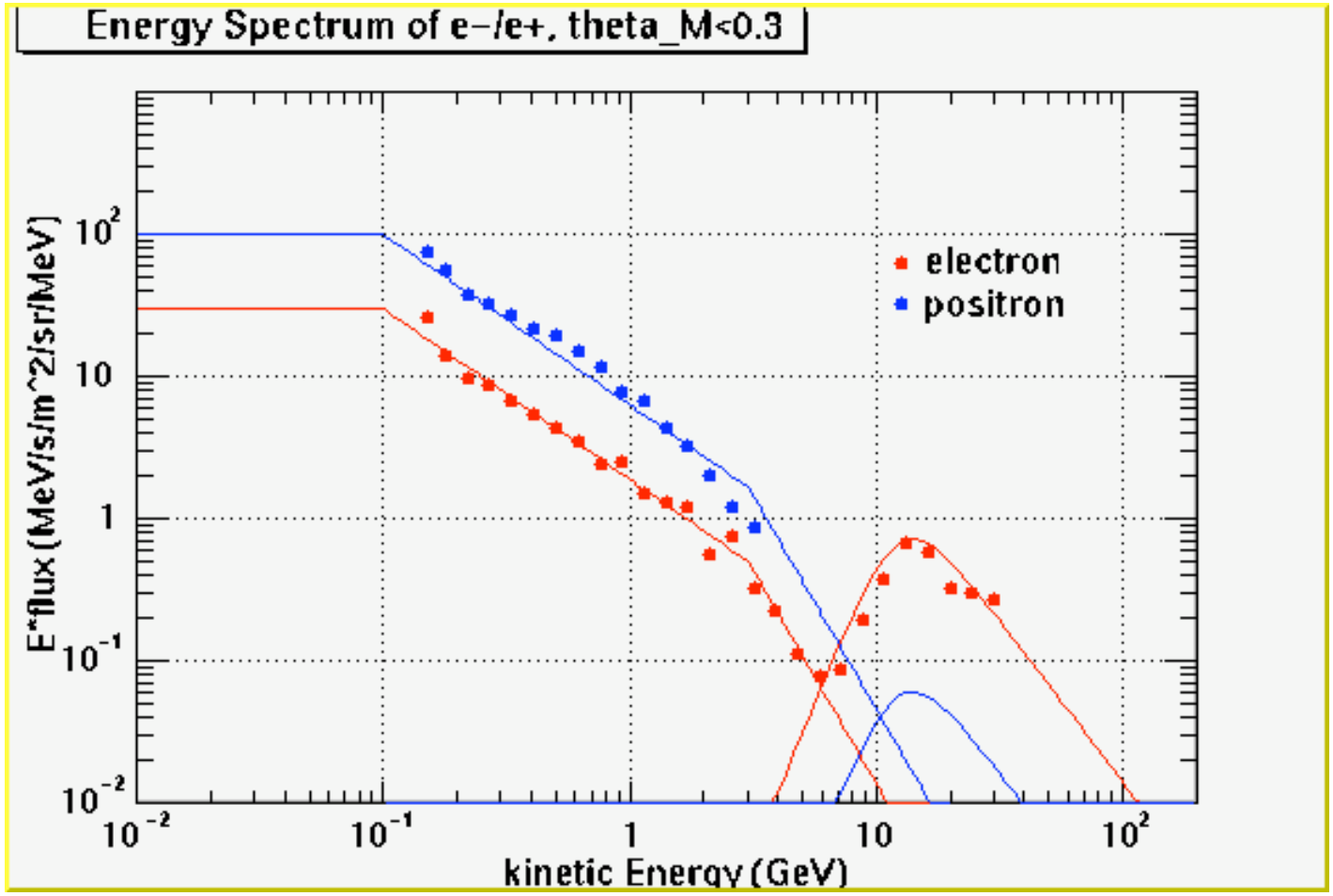


What's in/not in DC2 model ?

- **In DC2:**
  - **Proton/alpha/heavy ions/e-/e+/gamma (i.e., major component of particle background)**
  - **Orbital variation/Solar modulation for charged particles**
  - **Flux is well modeled above 150MeV for vertically upward/downward (AMS data, etc.)**
- **Not in DC2**
  - **Flux below 150MeV (just extrapolate with E-1)**
  - **Zenith angle asymmetry (just assume isotropy.)**

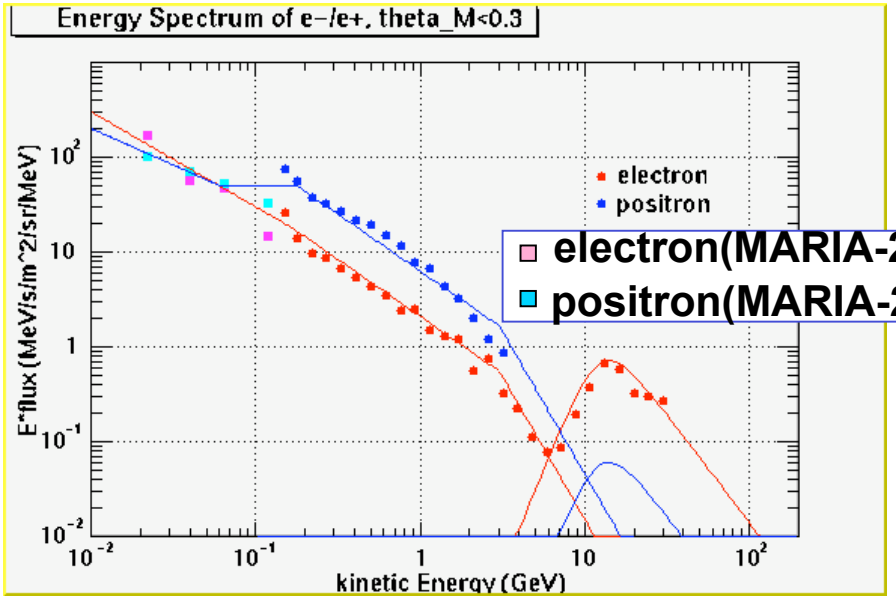
We background review team examined literatures (data and theory) extensively and concluded that model below 150 MeV need to be updated, especially e- and e+.

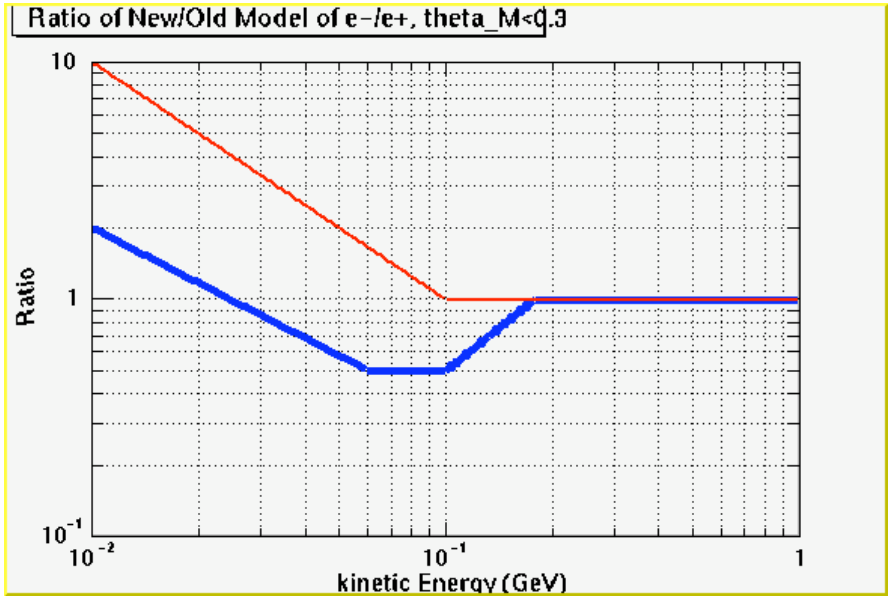
e-/e+ in equatorial region (DC2 model)



Model functions used in DC2 with AMS data for e-/e+. Note that fluxes above 150 MeV were well measured and are represented by models.

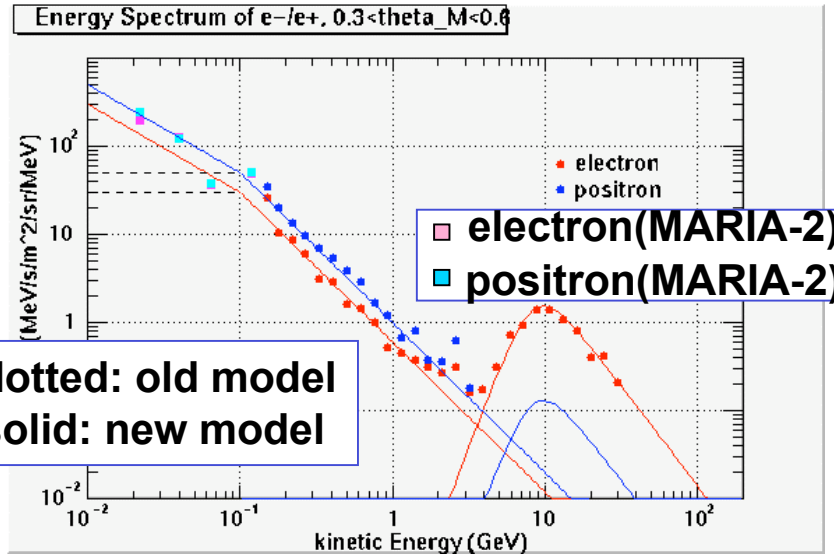
e-/e+ in equatorial region (updated)

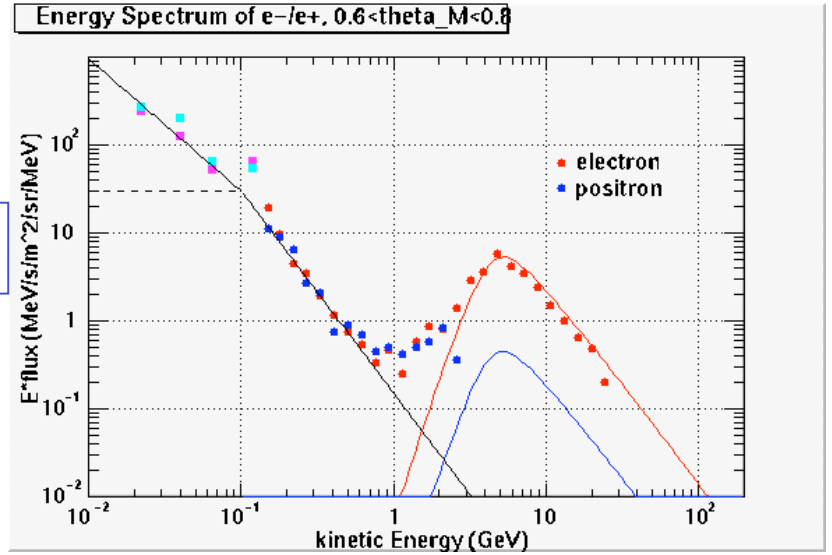




- MARIA-2 data (Voronov et al. 1991; Mikhailov 2002) provides us with angle-integrated flux below 150 MeV. They also show much smaller positron overabundance. We updated the model based on their data.
- Ratio of new/old model is given in right panel: integrated flux (10-150 MeV) increased by a factor of 1.5. Fluxes in 30-150 MeV (which contribute to BG) are almost the same.

Higher Latitude Region

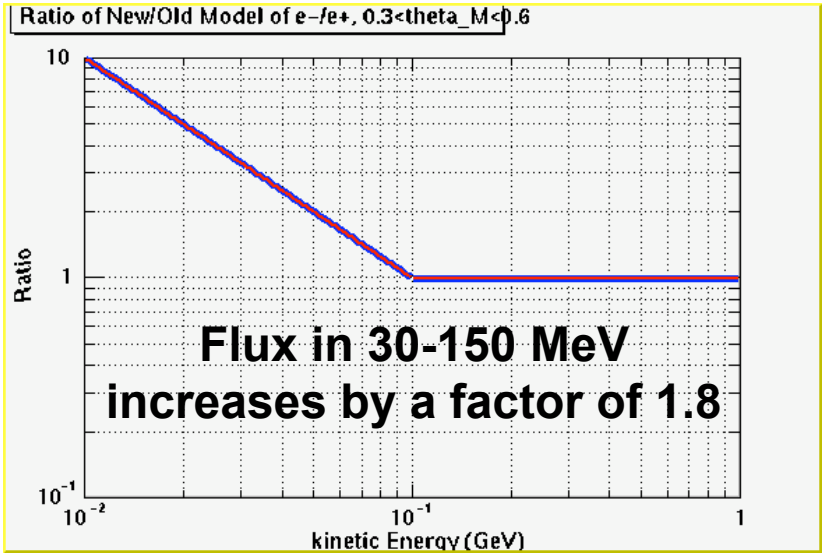


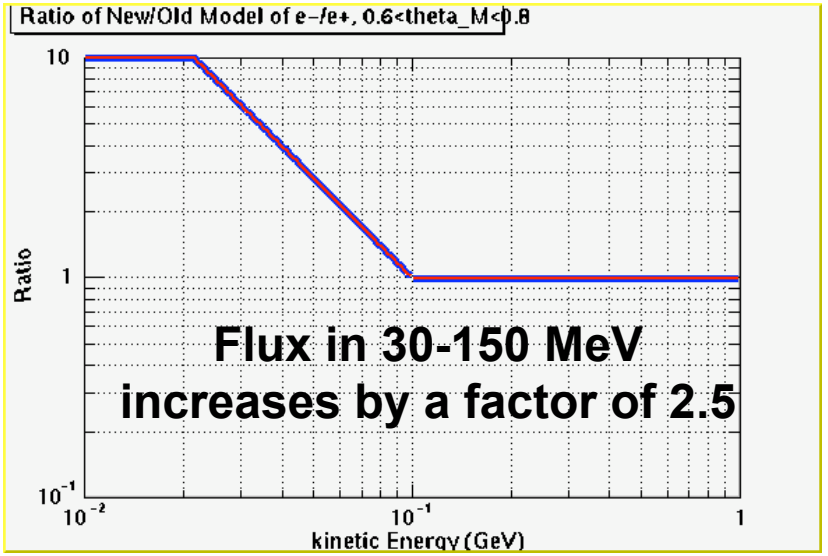


electron(MARIA-2)

positron(MARIA-2)

dotted: old model
solid: new model





Summary

- **DC2 model is about right**
  - **primary is well measured and fairly uniform.**
  - **Secondaries (e-/e+/proton) in vertical direction above 150 MeV are well measured by AMS and well modeled including orbital variation.**

- **Zenith angle asymmetry and the flux below 150 MeV need to be validated.**
  - **e-/e+ model is updated. In high latitude region, integrated flux increased by a factor of ~2 and so does the background below 150 MeV. No big difference in equatorial region.**

- **Remaining issues:**
  - **proton (data below 35 MeV by NINA and NINA-2)**
  - **atmospheric gammas (possible orbital dependence.)**