

Update on CTA-LST activities in Poland

J. Sitarek, K. Adamczyk,
P. Gliwny, D. Sobczyńska, M. Szanecki

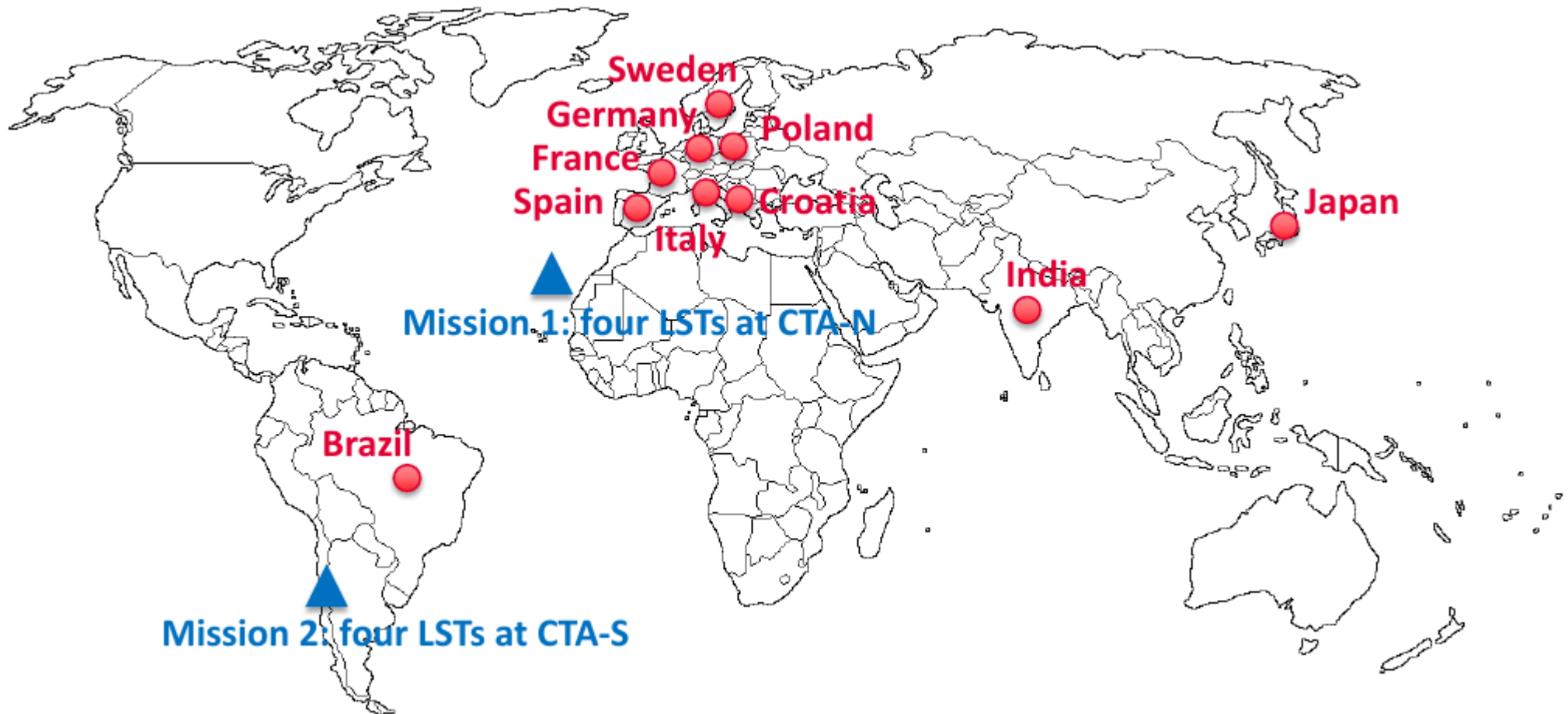
20.05.2019, Astroparticle physics in Poland, Warsaw

LST in CTA

- The biggest type of telescopes in CTA – 23m diameter
- Designed for optimal performance in the energy range of tens of GeV
- 2 x 4 telescopes planned for both CTA sites

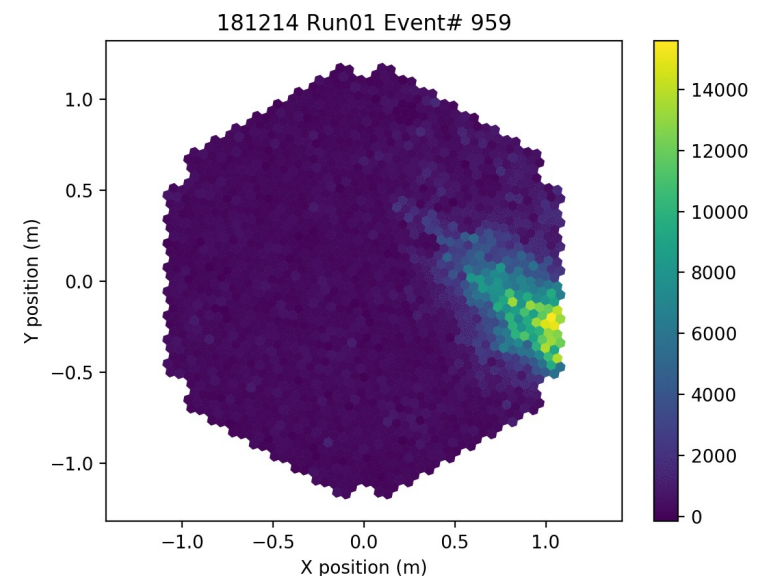
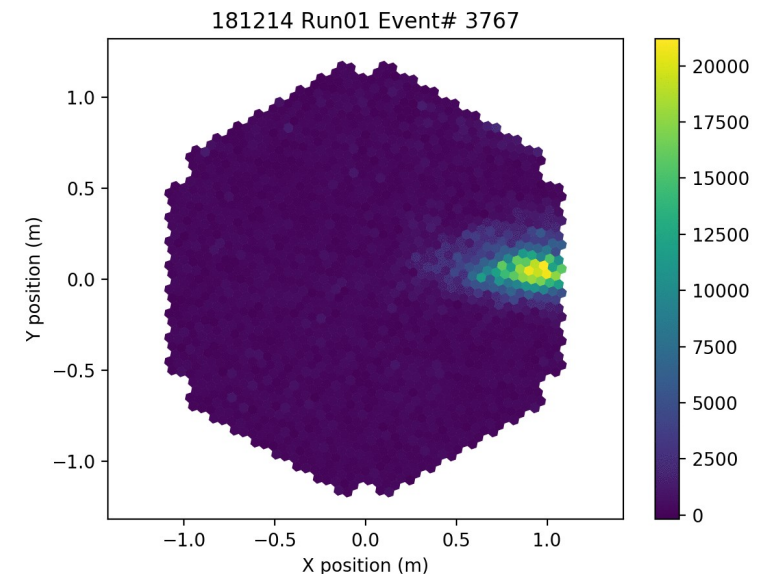


LST sub-consortium



LST status

- LST1 prototype construction finished in La Palma site
- First light shower images obtained in December 2018
- Ongoing commissioning in the next months, testing and optimization of operation parameters
- Next steps:
 - validation if the prototype can become a part of the CTA
 - Construction of the LST2-4 in La Palma

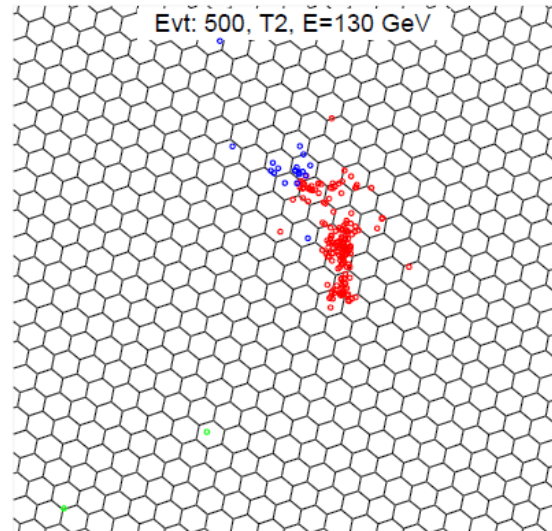
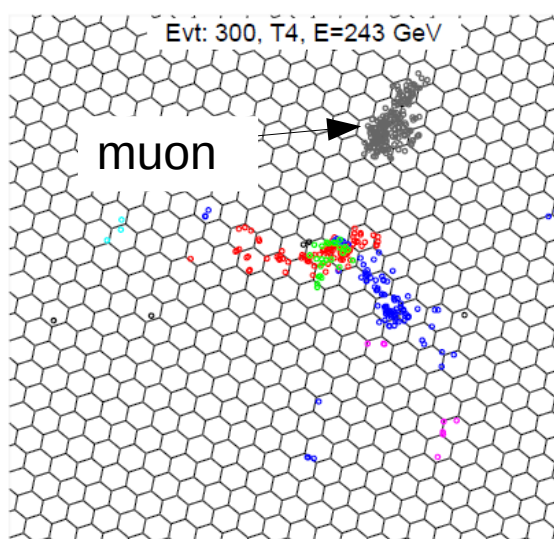


Polish participation in LST

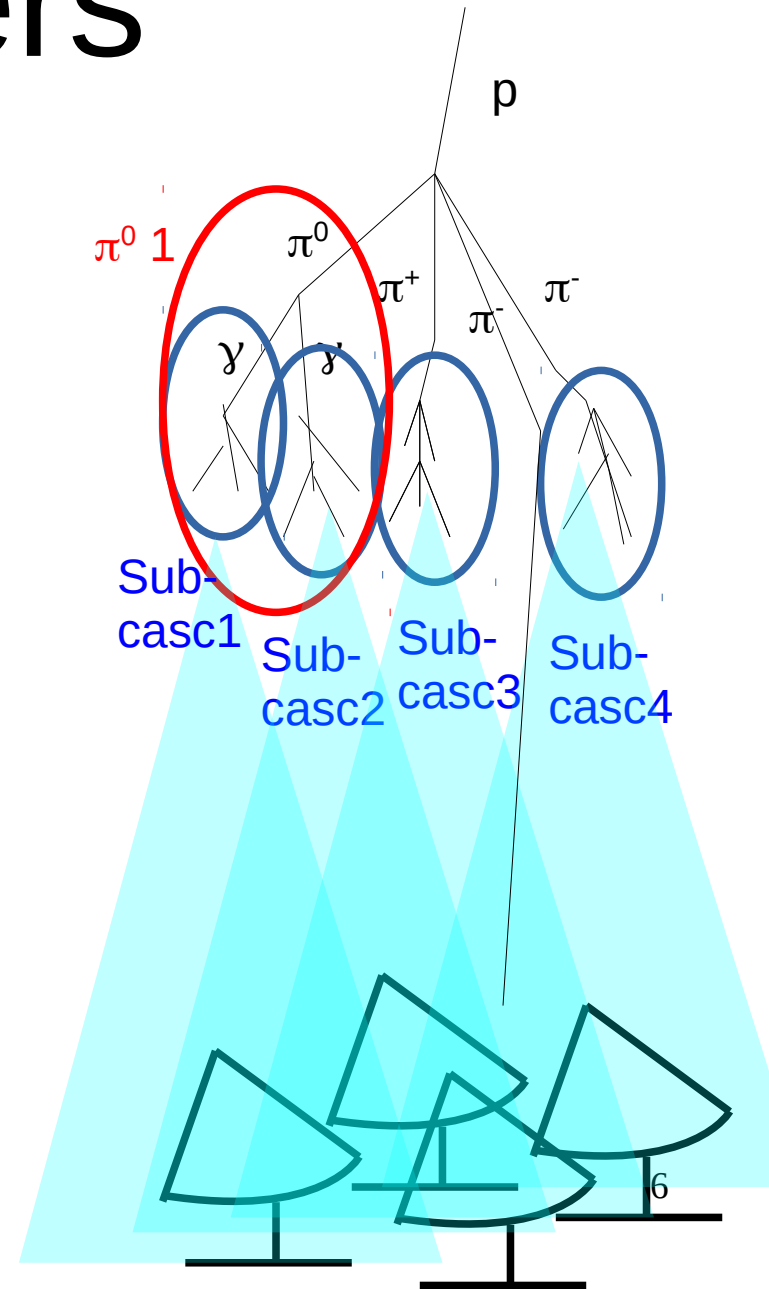
- Development of analysis procedures for LST readout system based on DRS4 chip: PG, JS
- Development of **low-energy focused analysis methods for Cherenkov telescopes using MC simulations**: JS, DS, KA, MSz

Single Electromagnetic Subshowers

- We investigated the images of showers in which nearly all the Cherenkov photons come from a single subcascade (SES)
- Those events behave like gamma-ray showers

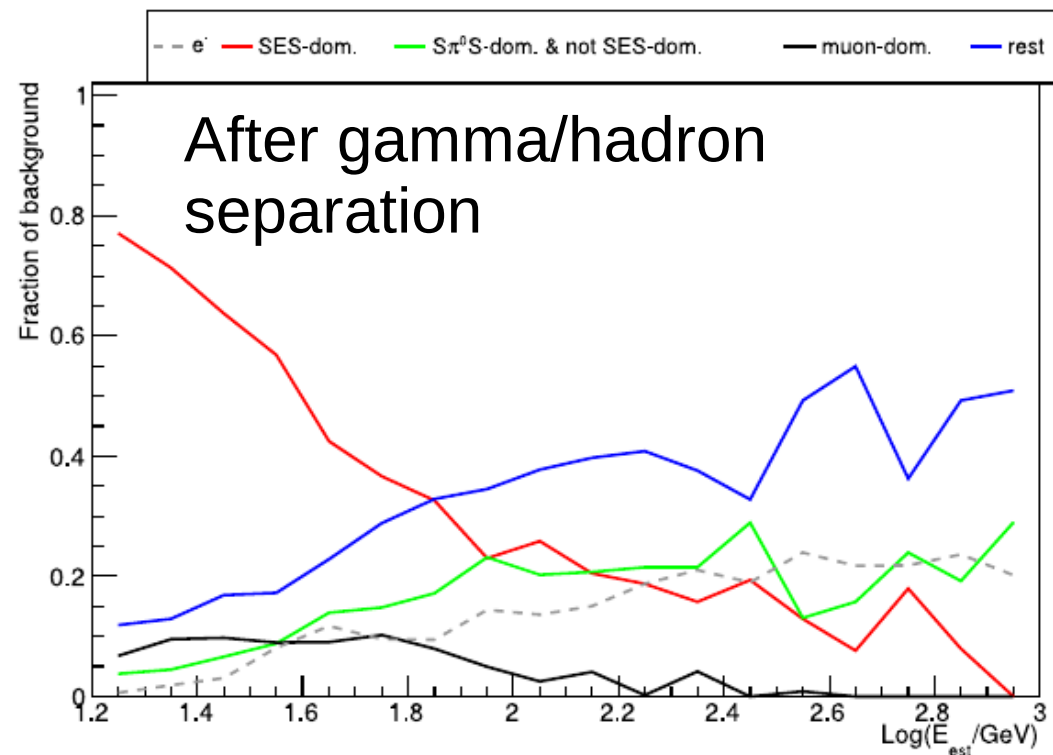
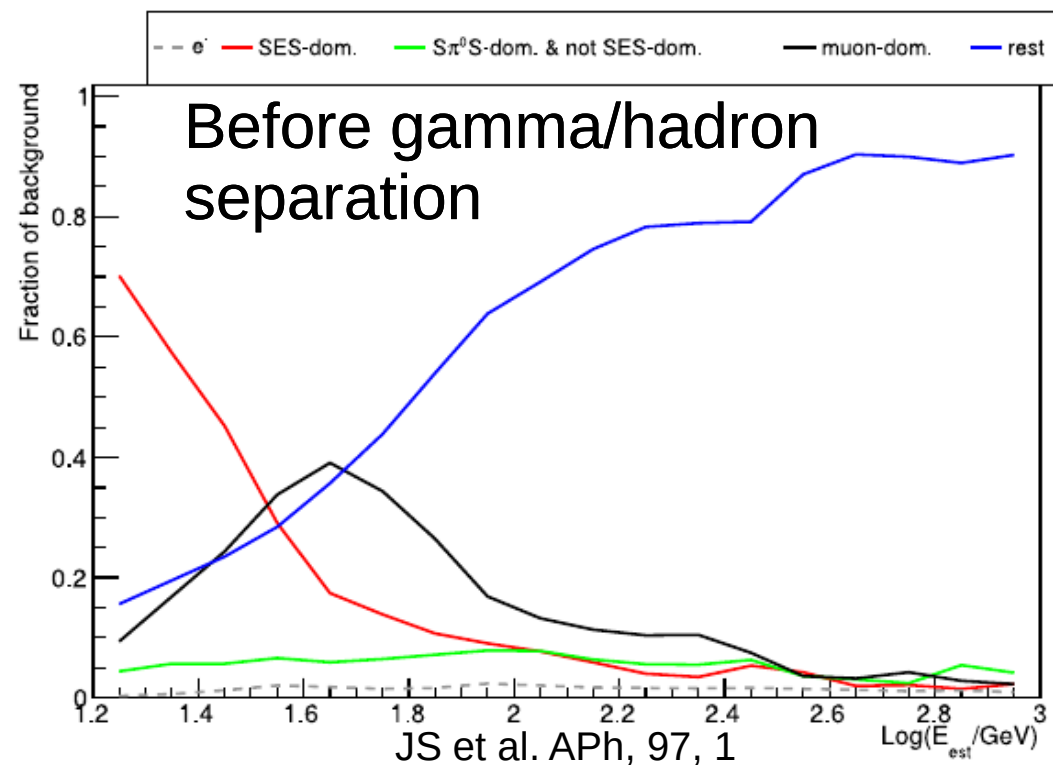


JS et al. APh, 97, 1



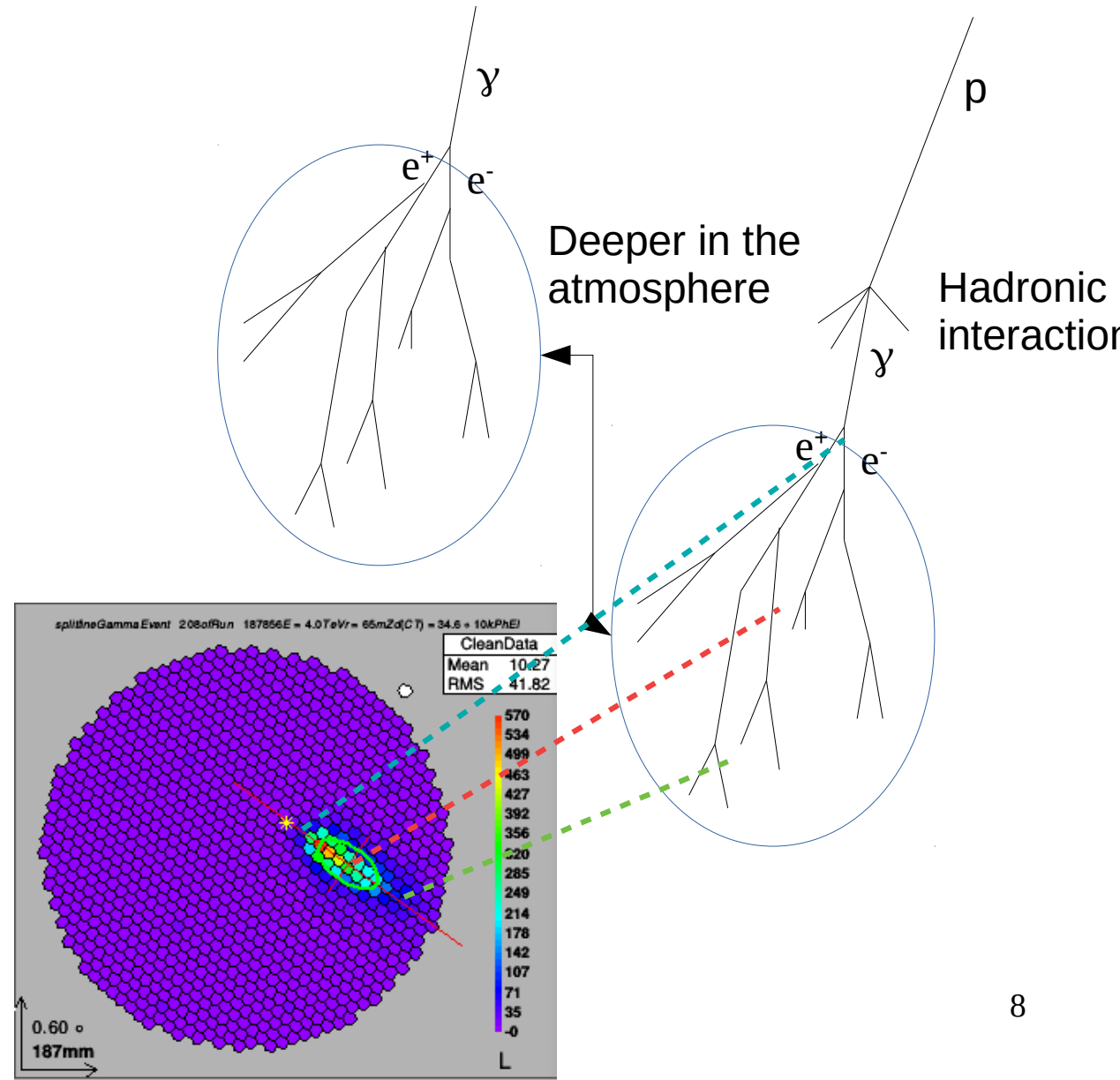
LST residual background

- At the energies of a few tens of GeV SES events will constitute the main background of LST
- Very limited rejection of SES events (via estimation of the shower maximum position) is possible



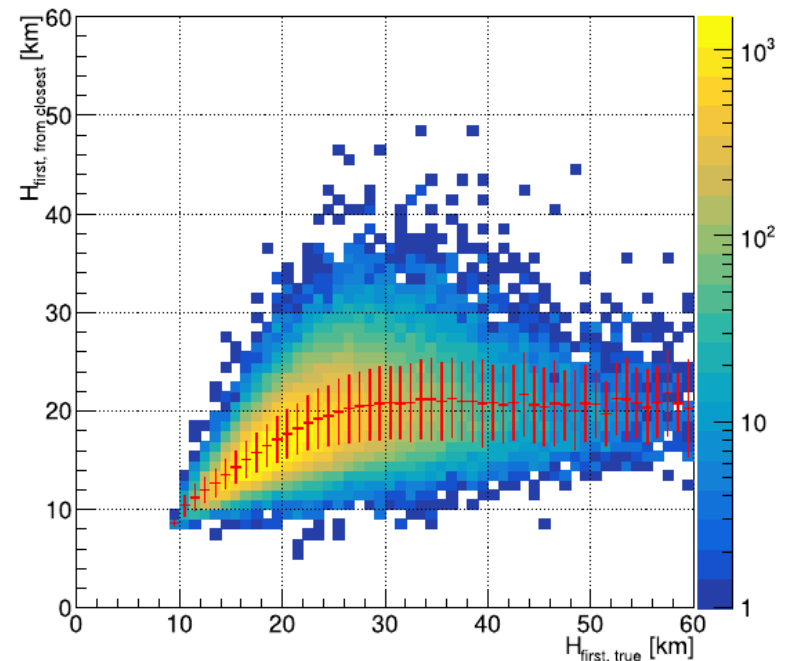
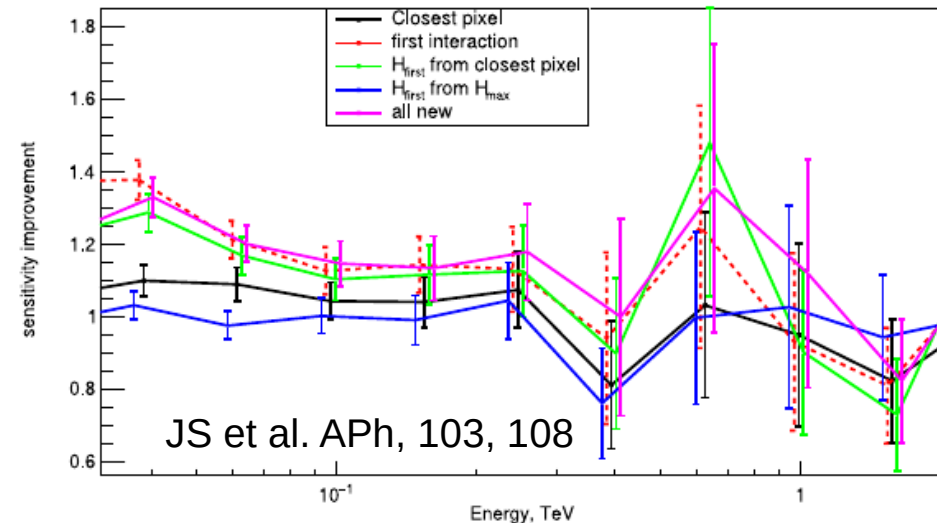
Rejection of SES events via height of the first interaction

- We derived a simple geometrical method for reconstruction of the height of the first interaction
- The method can be used for rejection of SES events (and other types of hadronic background)



H_{1st} parameter for sensitivity

- The resolution of the height of the first interaction estimation is poor (about $1 X_0$), but it still allows a mild gain (~ 10 - 20%) in the LST sensitivity at the lowest energies (30-200 GeV)



Conclusions

- The first LST finished construction and it is being commissioned now
- Stay tuned for more results