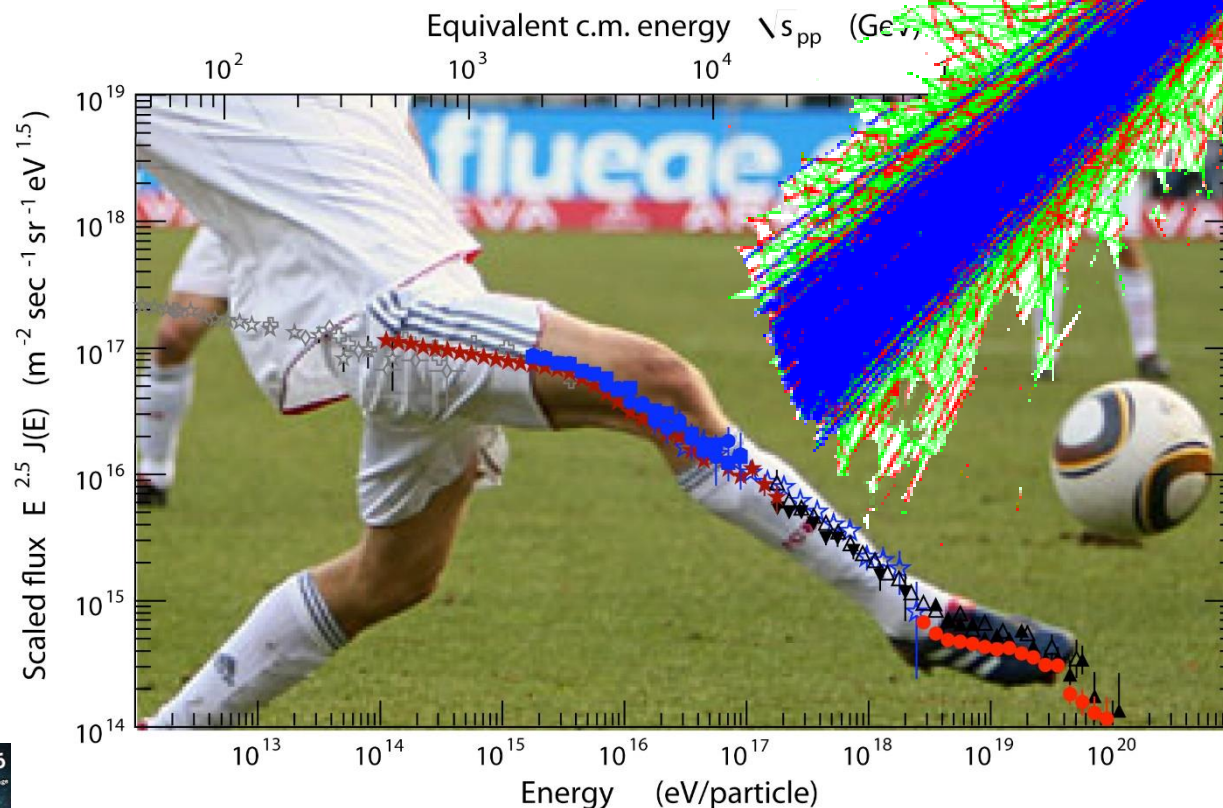


cosmic ray COMPOSITION in the galactic to extragalactic transition range

September, 21-23, 2015, KIT



HAP Workshop 2015

COMPOSITION in the galactic to extragalactic transition range

Topics:

- Spectrum, Anisotropy and Elemental Composition of Cosmic Rays in the PeV-EeV range
- Systematics due to Hadronic Interaction Models
- Astrophysical Interpretation of the data and Galactic-Extragalactic Transition Models

September 21-23, 2015
at Karlsruhe Institute of Technology (KIT, Campus North)

Program Committee:

Denis Allard, Doug Bergmann, Pasquale Blasi, Ralph Engel, Francis Halzen, Andreas Haungs, Johannes Knapp, Daniel Kuempel, Sergej Ostapchenko, Sven Schoo

Local Organisation:

Sabine Bucher, Andreas Haungs, Sven Schoo



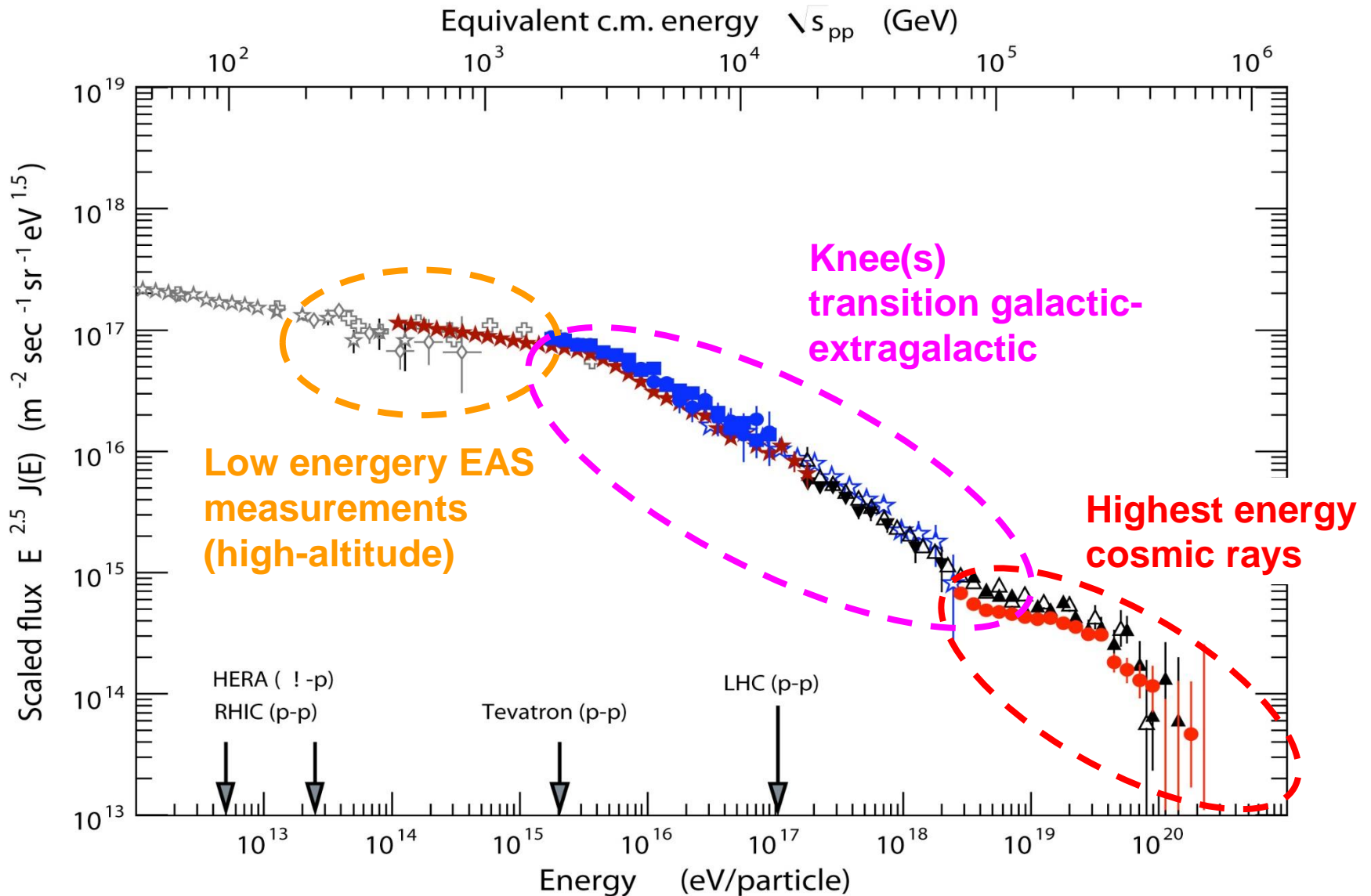
<https://indico.scc.kit.edu/indico/e/composition2015>



Topics:

- Spectrum, Anisotropy and Elemental Composition of Cosmic Rays in the PeV-EeV range
- Systematics due to Hadronic Interaction Models
- Astrophysical Interpretation of the data and galactic-extragalactic transition models

High-energy cosmic ray spectrum



2014: Main Experiments 10^{16} - 10^{18} eV

KASCADE-Grande



IceTop (IceCube)

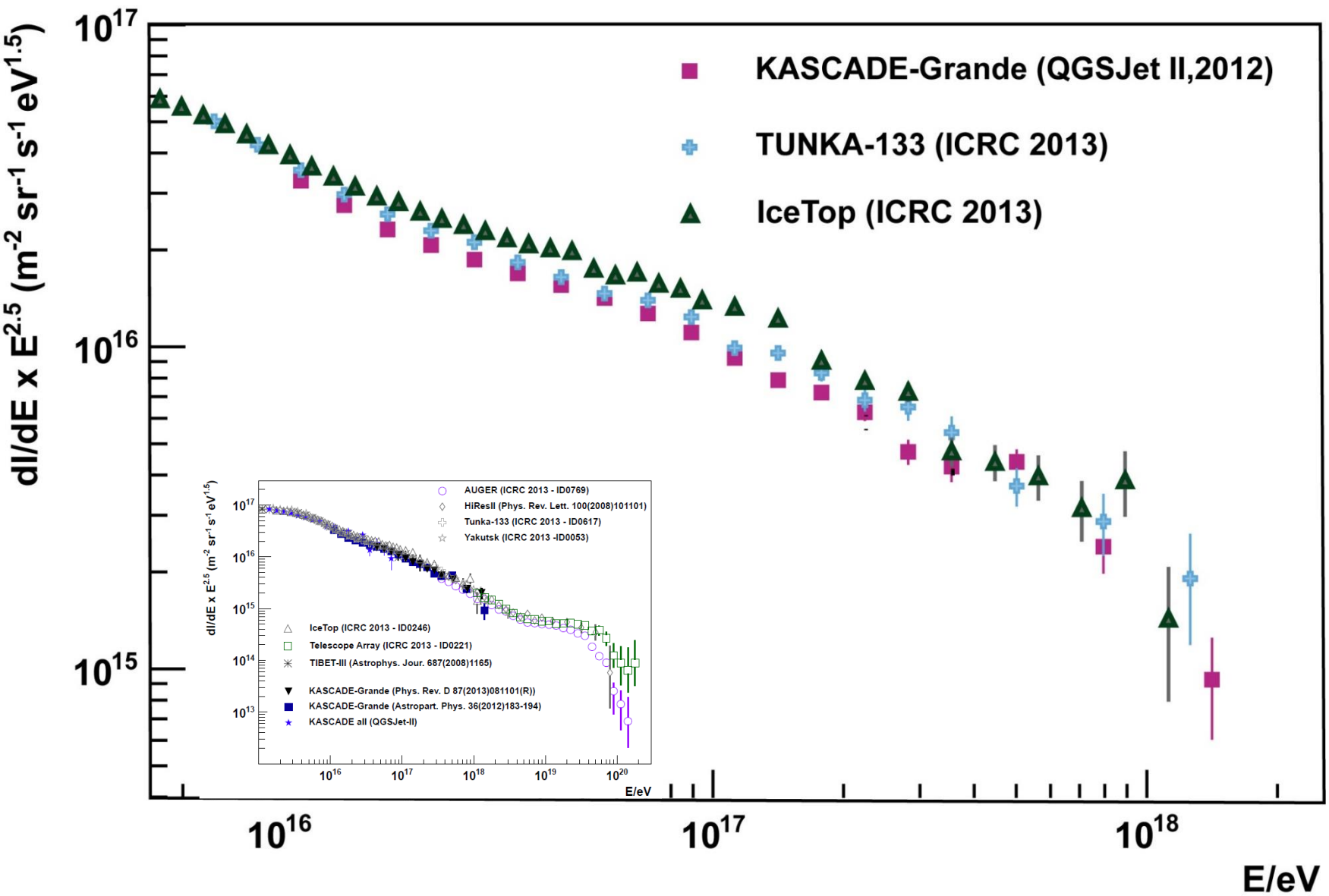


Tunka



TALE

**Auger
Enhancements**



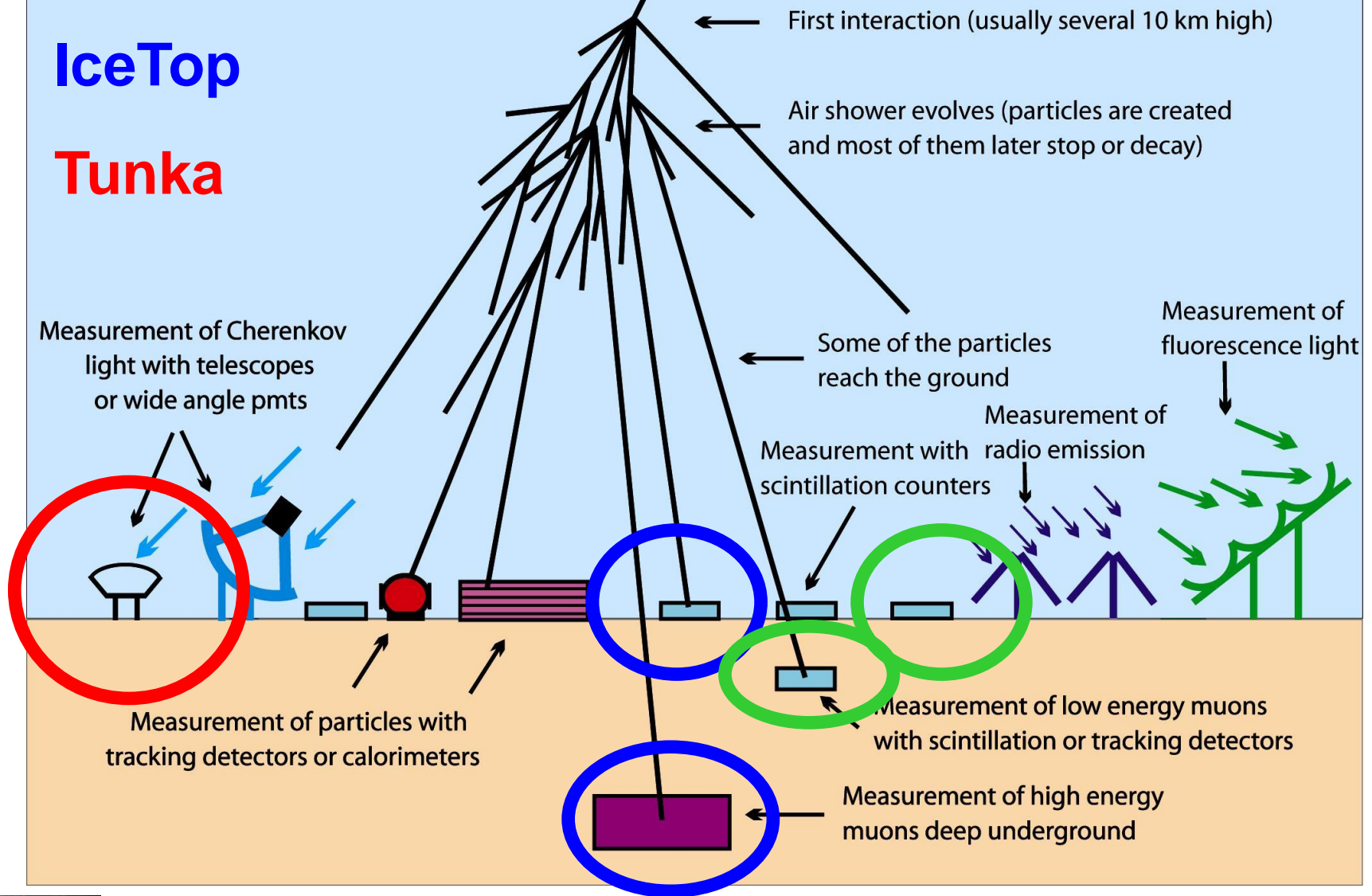
- Structures of all-particle spectra similar (in the level of 15%)

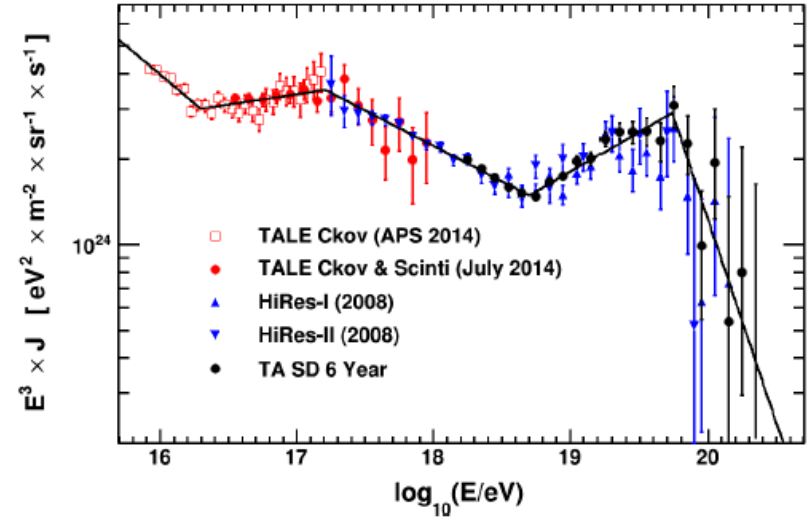
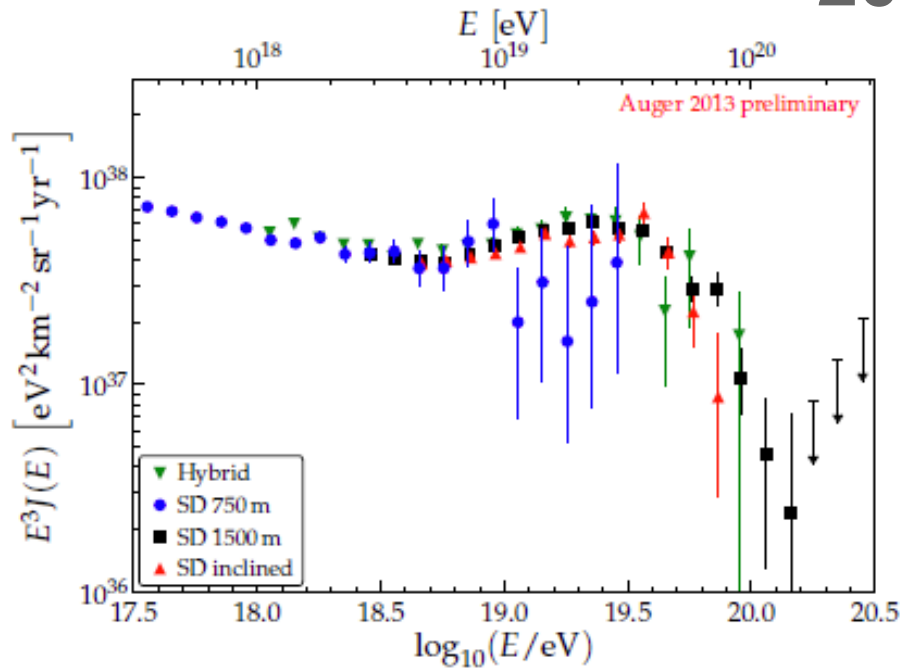
Measurement Techniques of Air Showers

KASCADE-Grande

IceTop

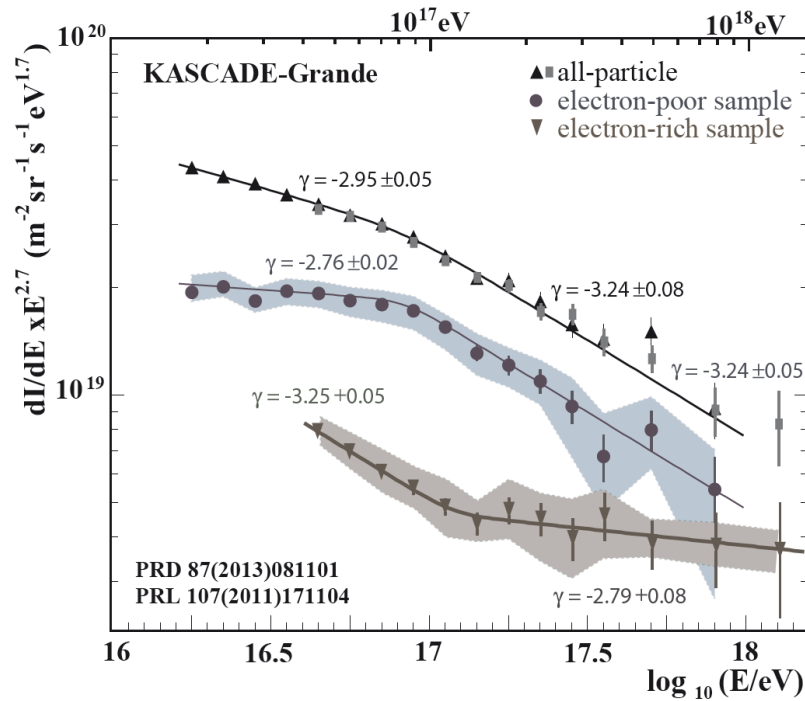
Tunka



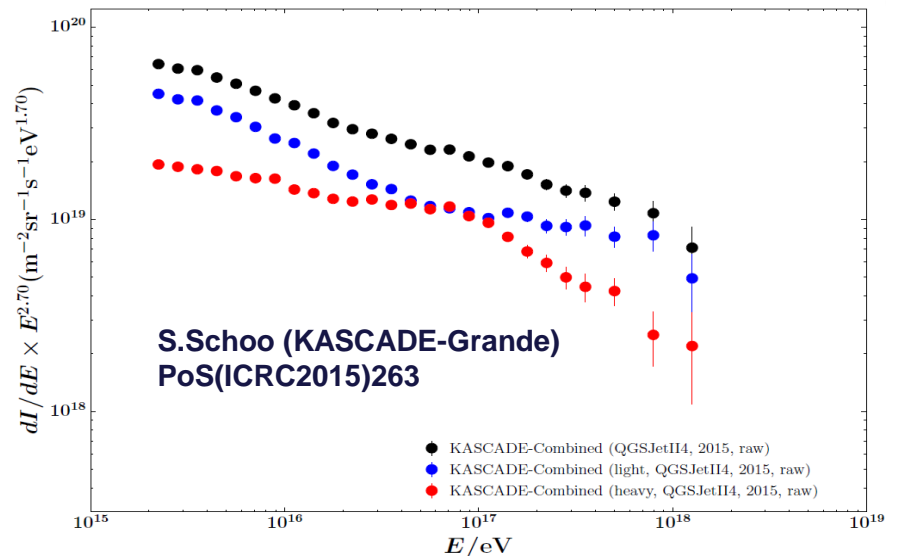
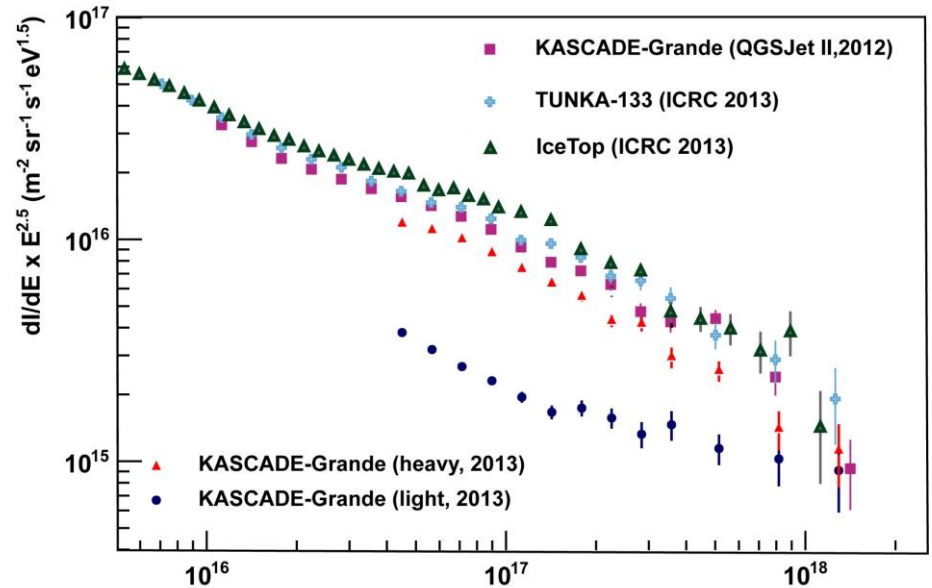


KASCADE-Grande

energy spectra of individual mass groups



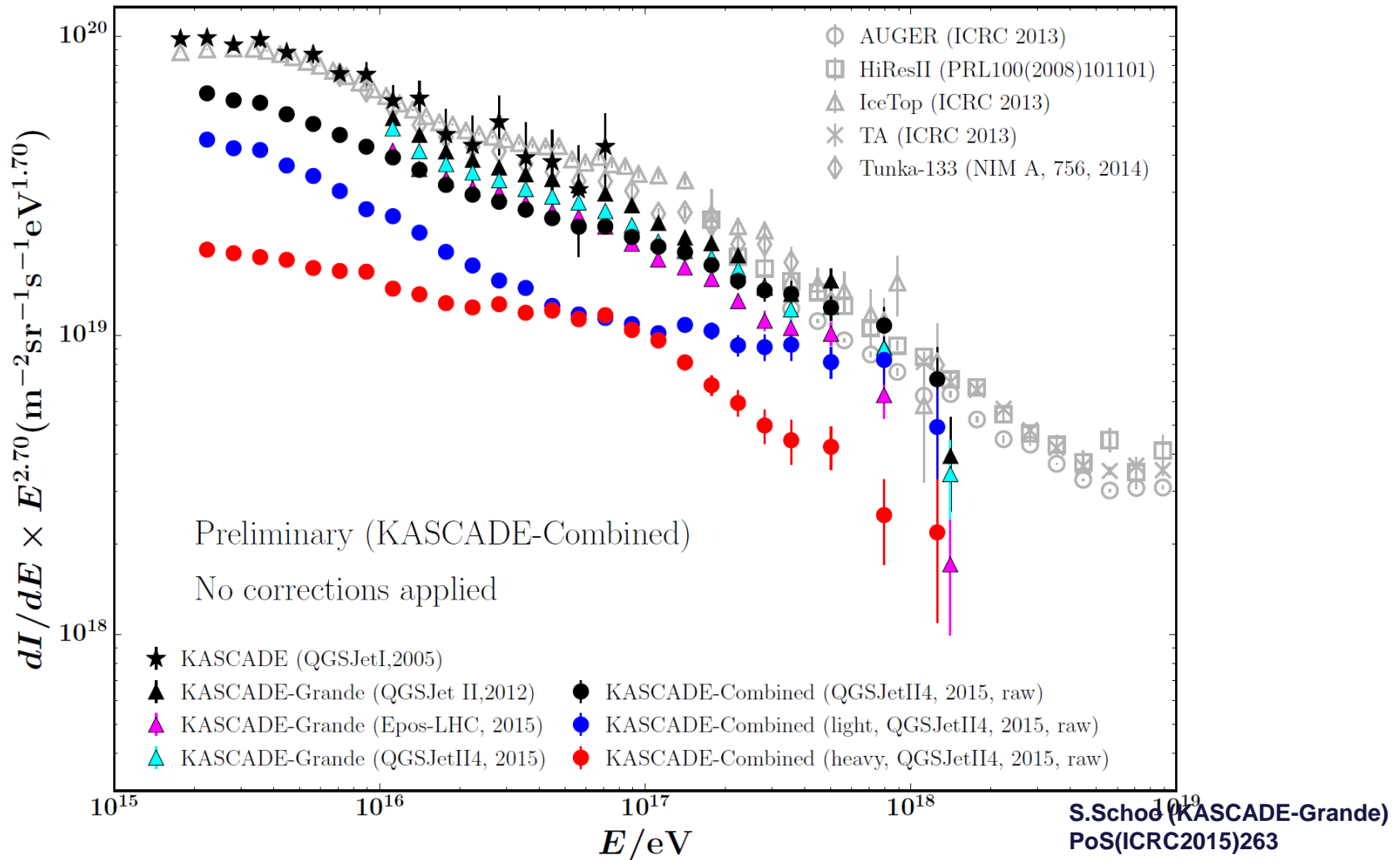
- steepening due to heavy primaries (3.5σ)
- hardening at $10^{17.08}$ eV (5.8σ) in light spectrum
- slope change from $\gamma = -3.25$ to $\gamma = -2.79$!



Organisationals

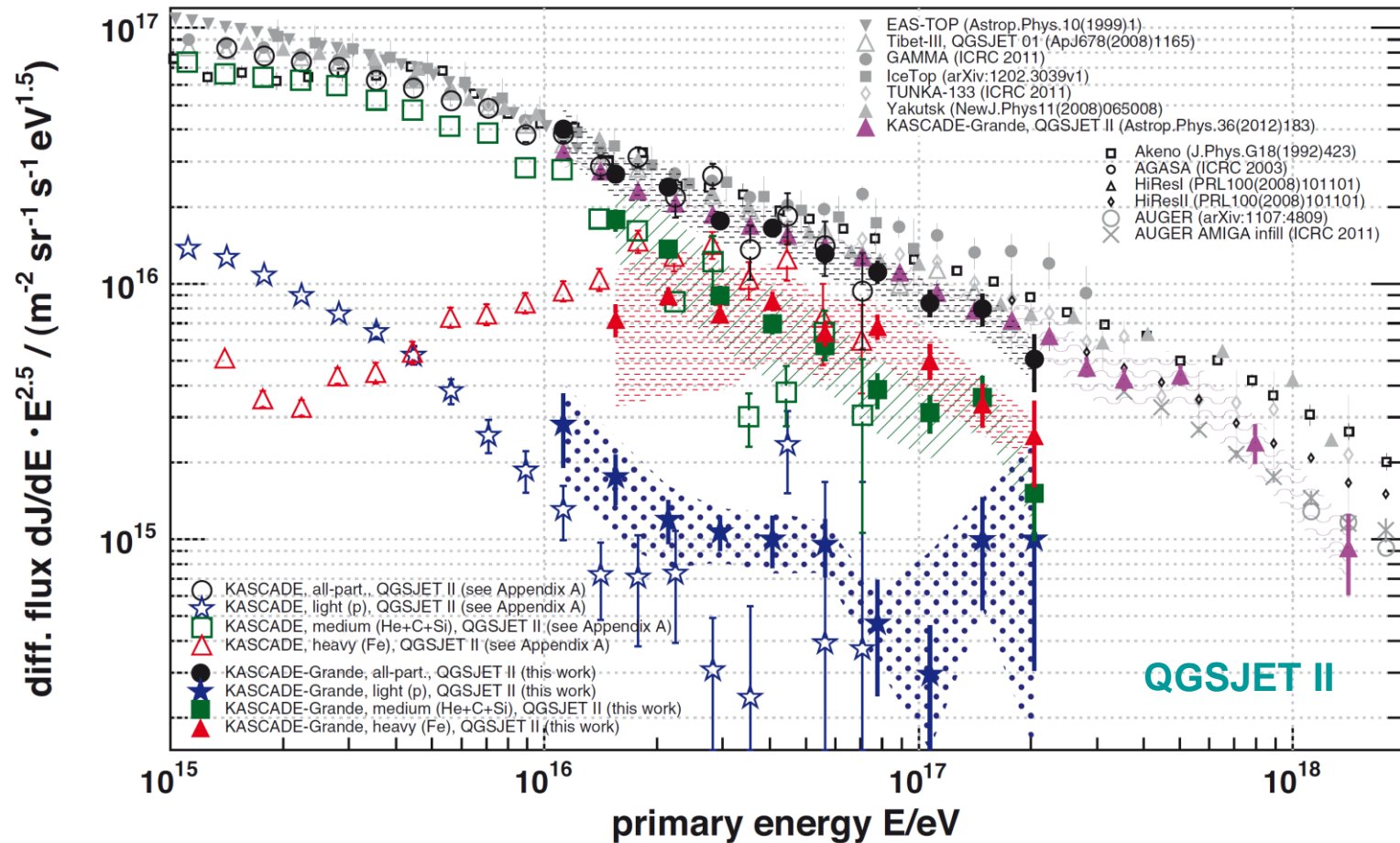
- Room:** **KIT, CN Bld 401 Room 410**
- Internet:** **Eduroam
personalized guest account (on request)**
- Transport:** **Bus transports to/from Hotels Eden/Greif
Wednesday afternoon ?**
- Coffee-Breaks:** **At the meeting room**
- Lunch:** **on your own in Cantina (we sell voucher) SORRY!**
- Dinner Tu'day:** **KIT CS together with HAP-DM-workshop
(invited, but common talk with DM before)
Transport organized from meeting room**
- Workshop Fee:** **50€ cash
receipt & participation confirmation**

Coherently reconstructed energy spectrum



- all-particle, light and heavy spectra from KASCADE-Grande (QGSJet-II-04)

Unfolding results: KASCADE and KASCADE-Grande



spectra of individual mass groups:

proton medium (He+C+Si) iron

- all spectra overlap and agree well!
- all three show a knee-like feature!!

Astroparticle Physics (2013)
arXiv:1306.6283

Light and Heavy Knees, Ankles, and Transition

