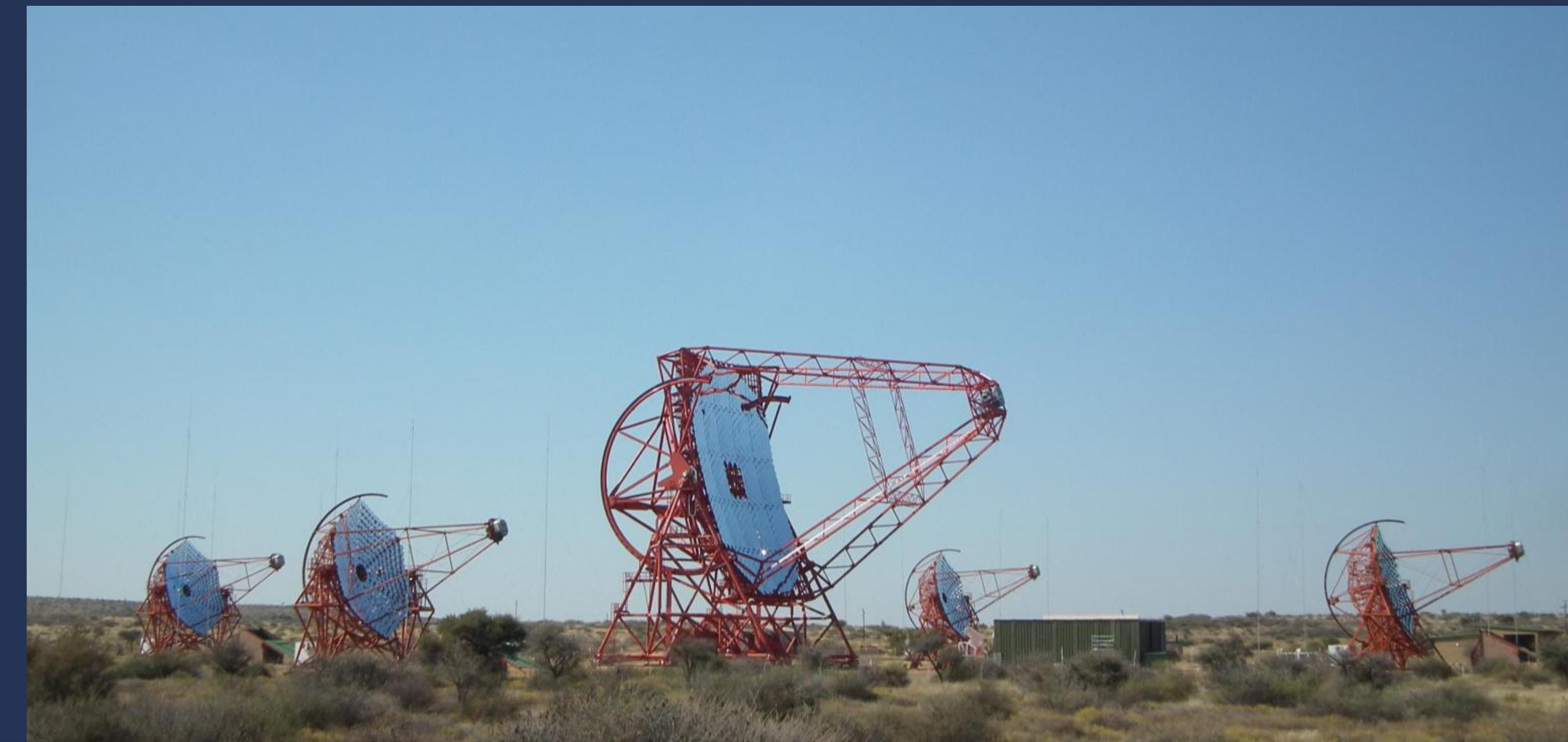


Observations of the Crab Nebula with H.E.S.S. Phase II

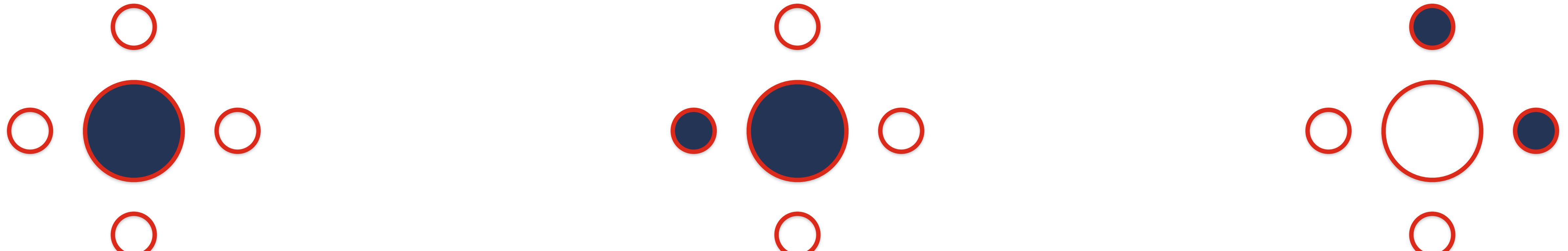
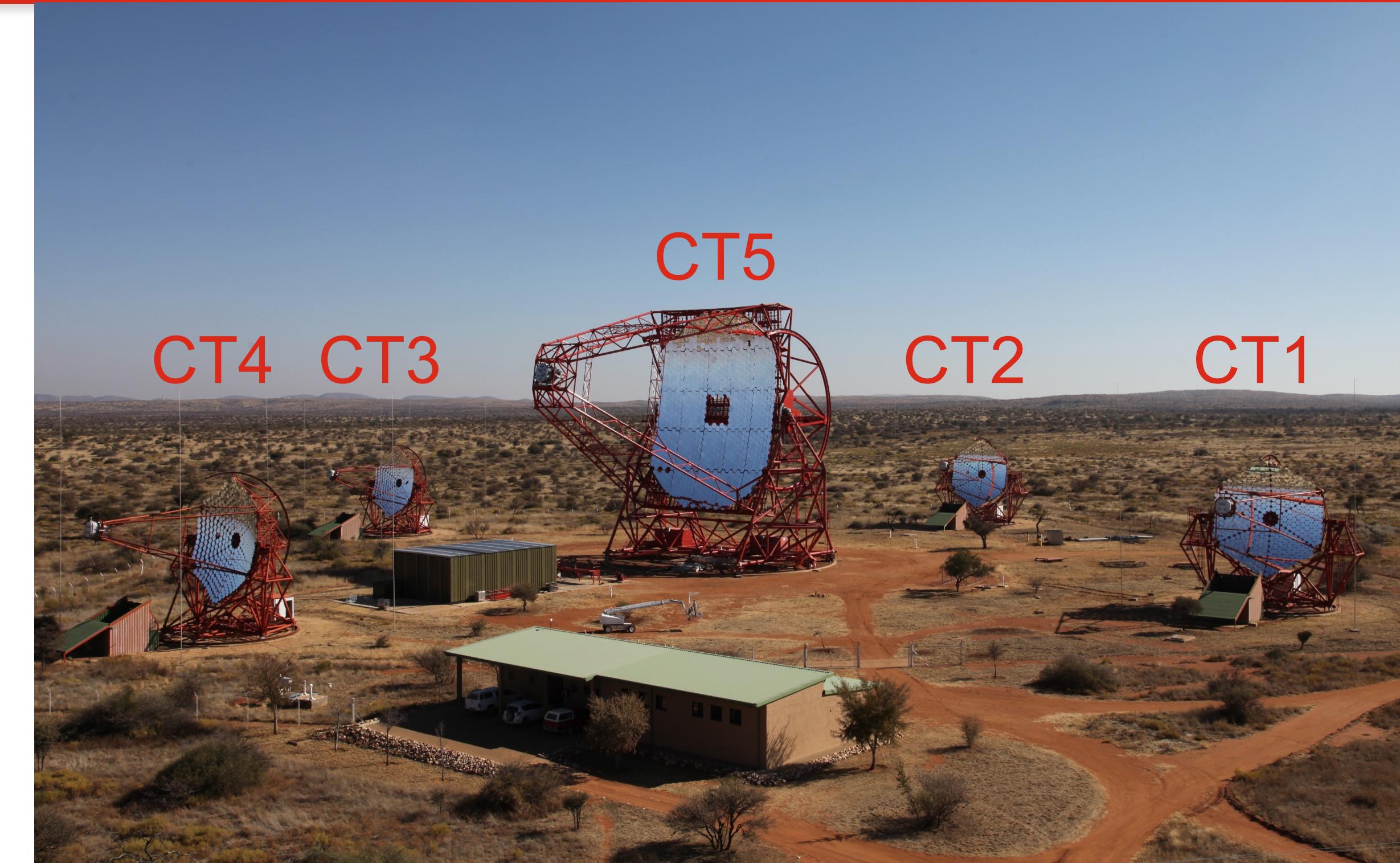
Evaluating the performance of the hybrid array

Markus Holler
for the H.E.S.S. Collaboration

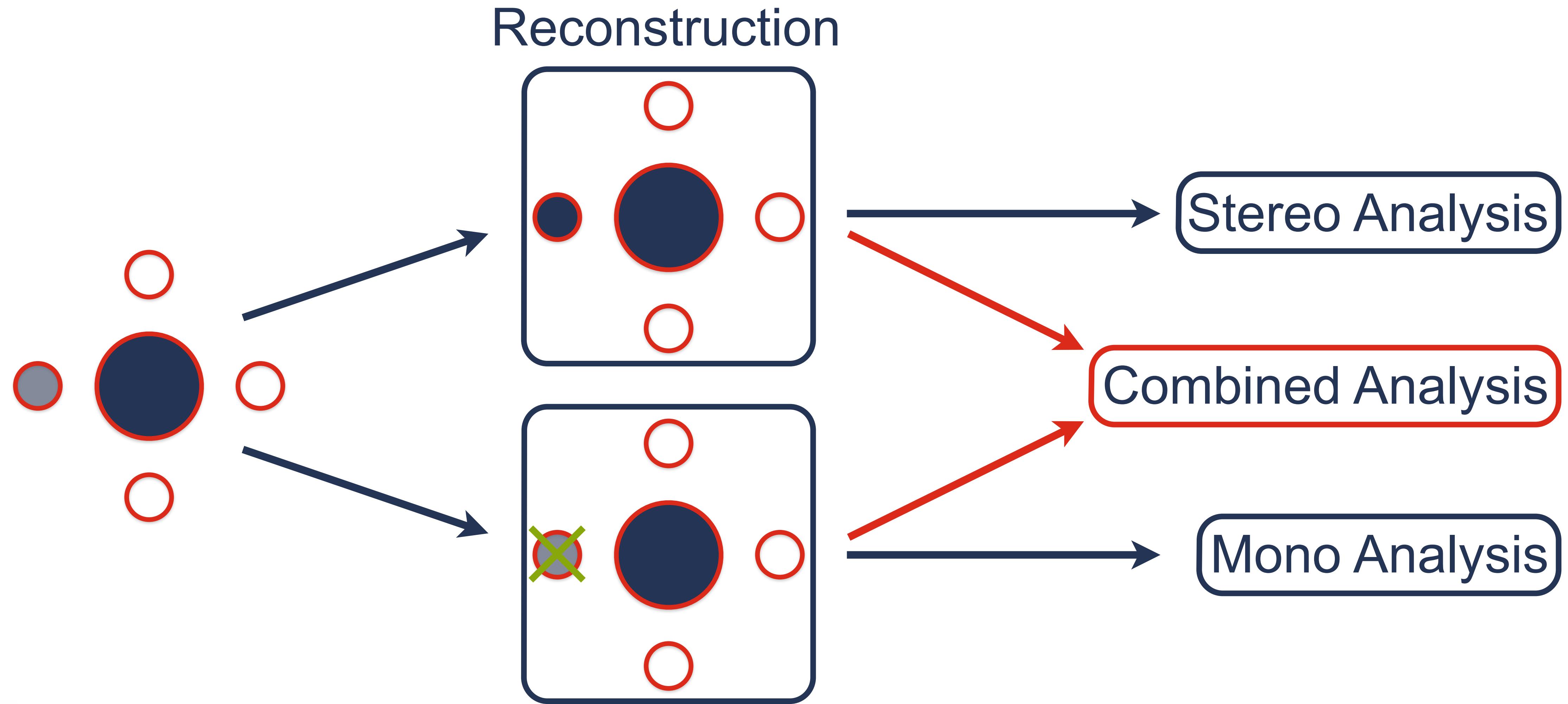


H.E.S.S. Phase II

- CT1-4: 12 m effective diameter
- CT5: 28 m effective diameter
- Trigger types:



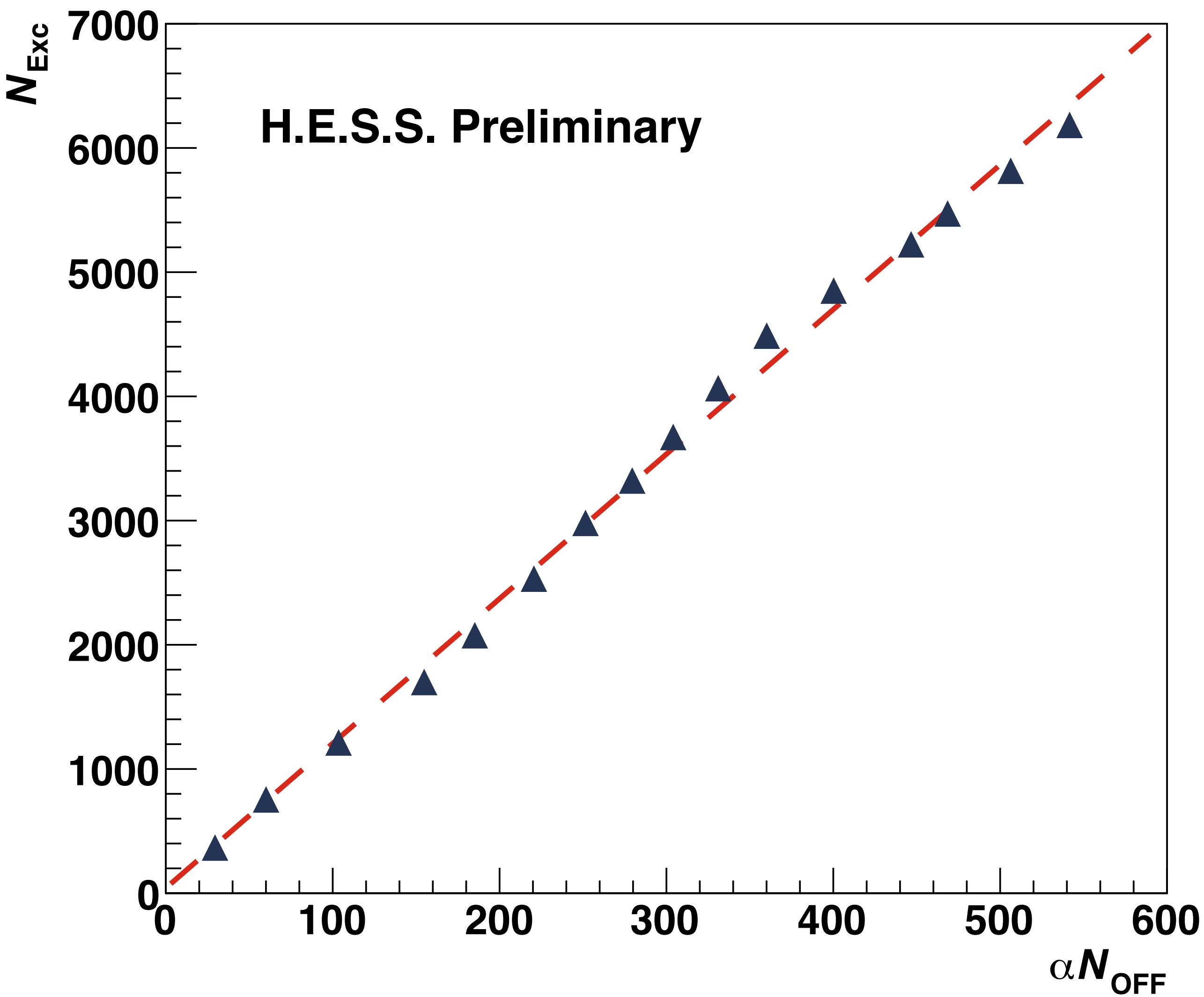
Reconstruction/Analysis Modes

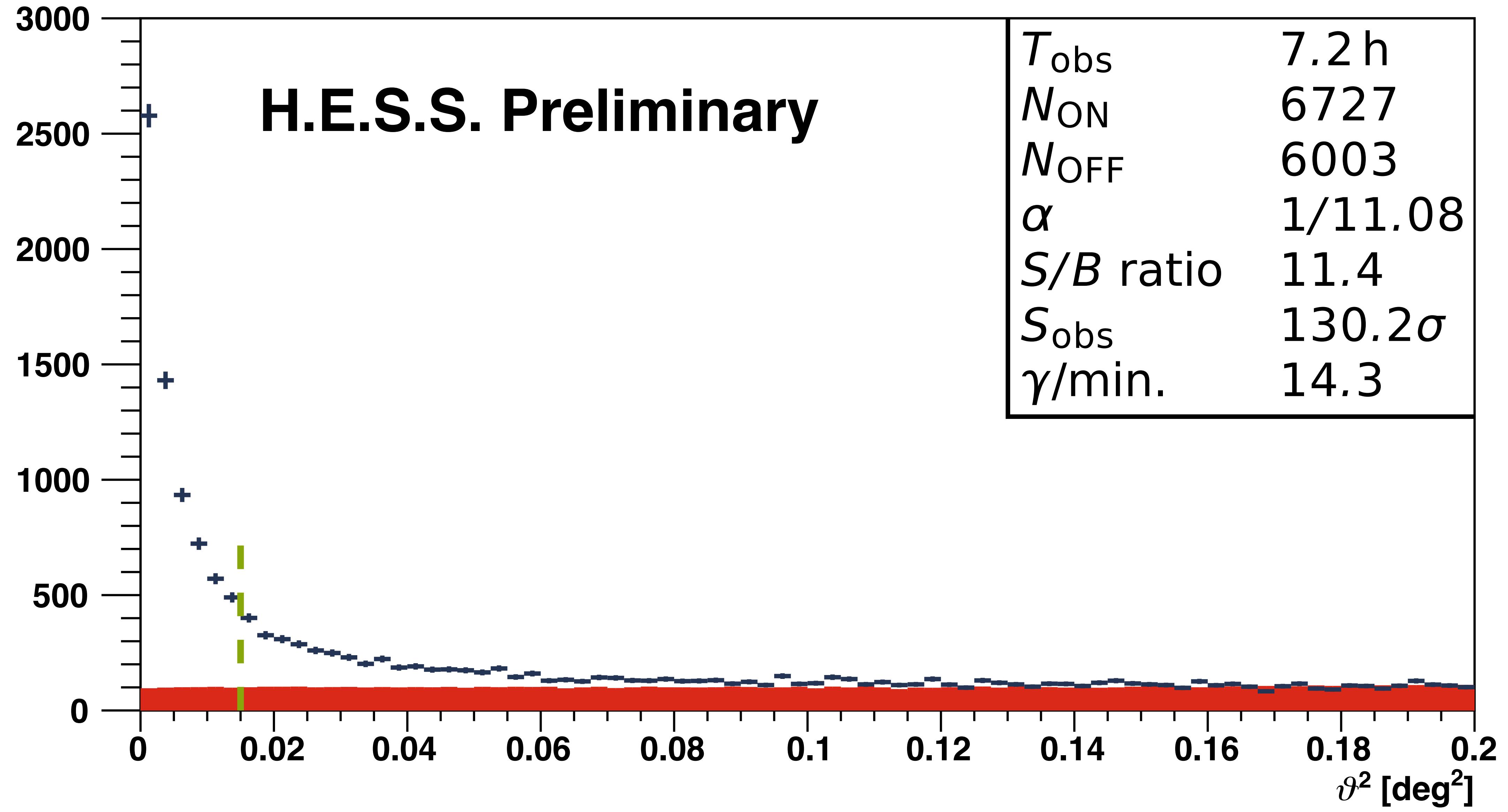


Observations of the Crab Nebula

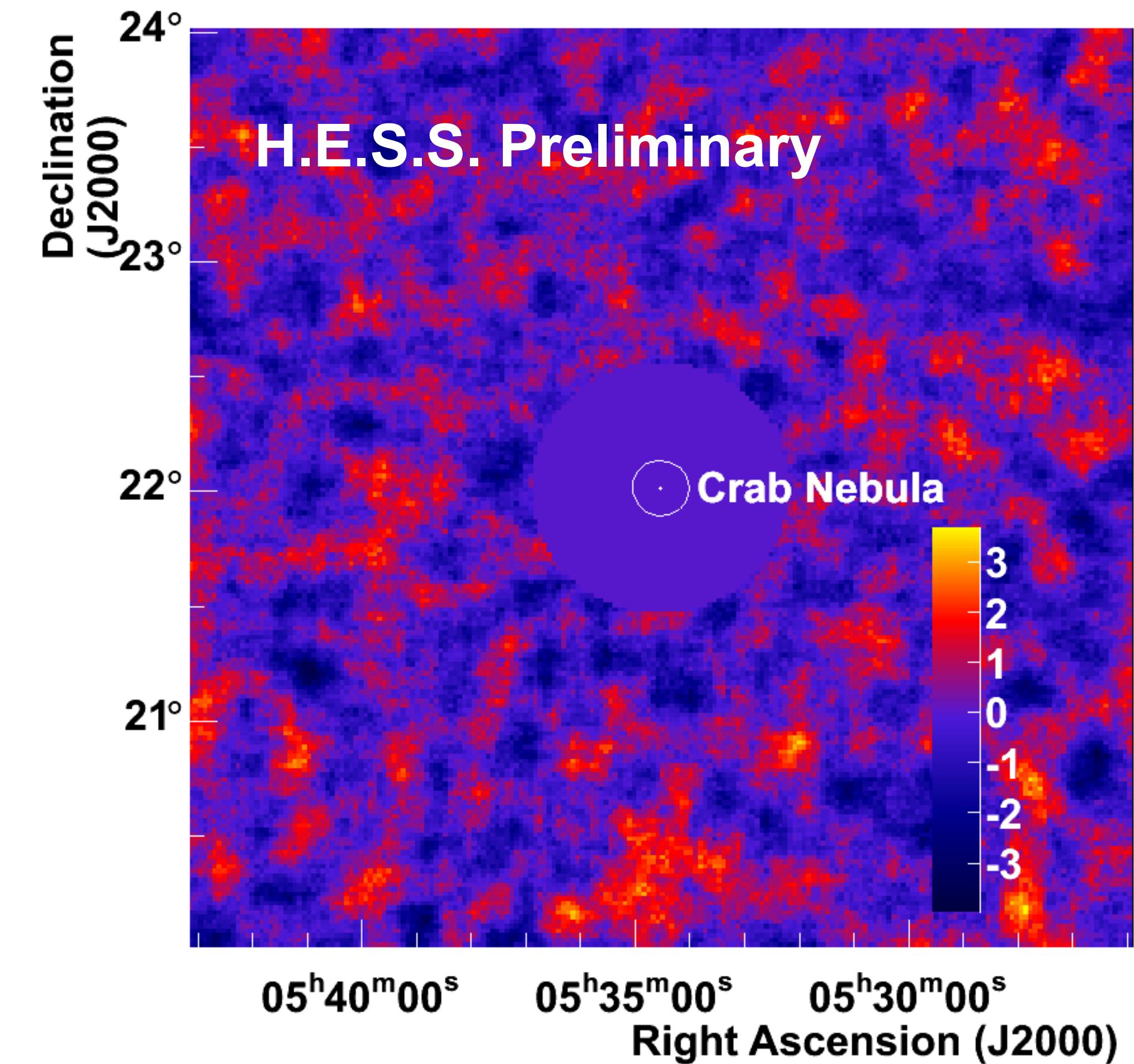
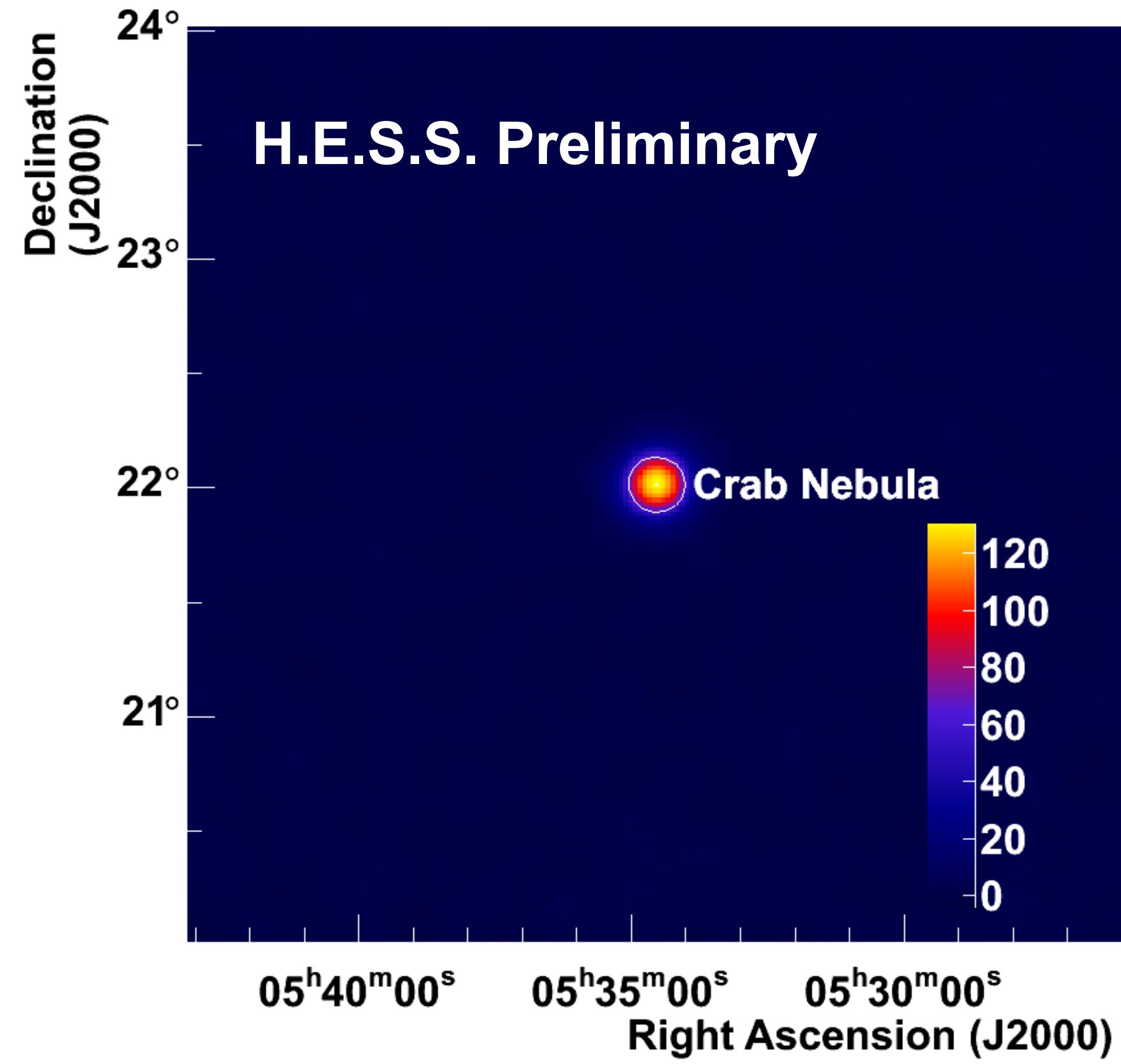
- Taken October/November 2014
- Raw live time 7.47 h
- Zenith angle range 45-55°

- Using Combined analysis mode
 - best covers the whole energy range
 - not as sensitive as Stereo at medium and high energies
 - further information: poster contribution ID 565

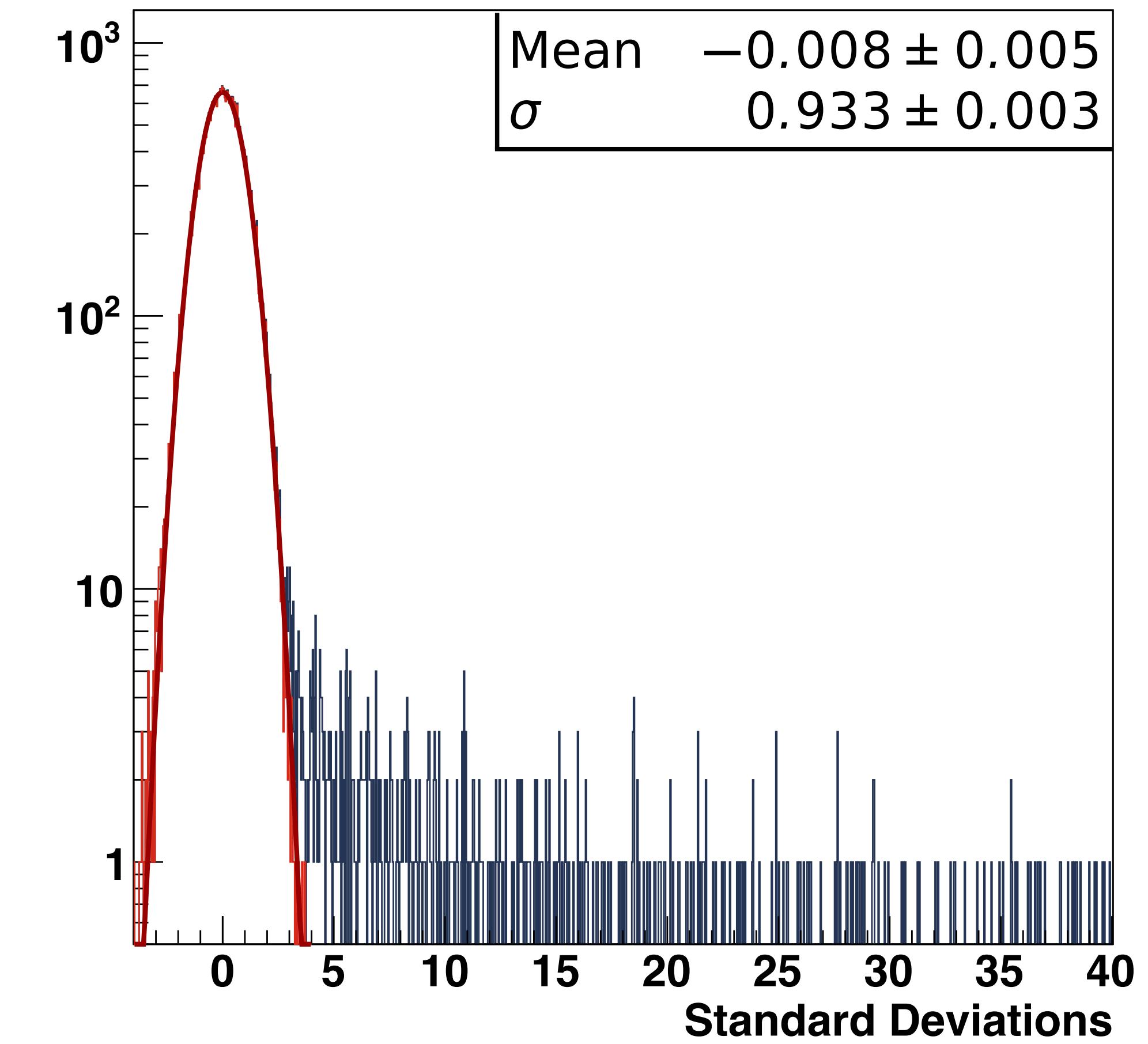
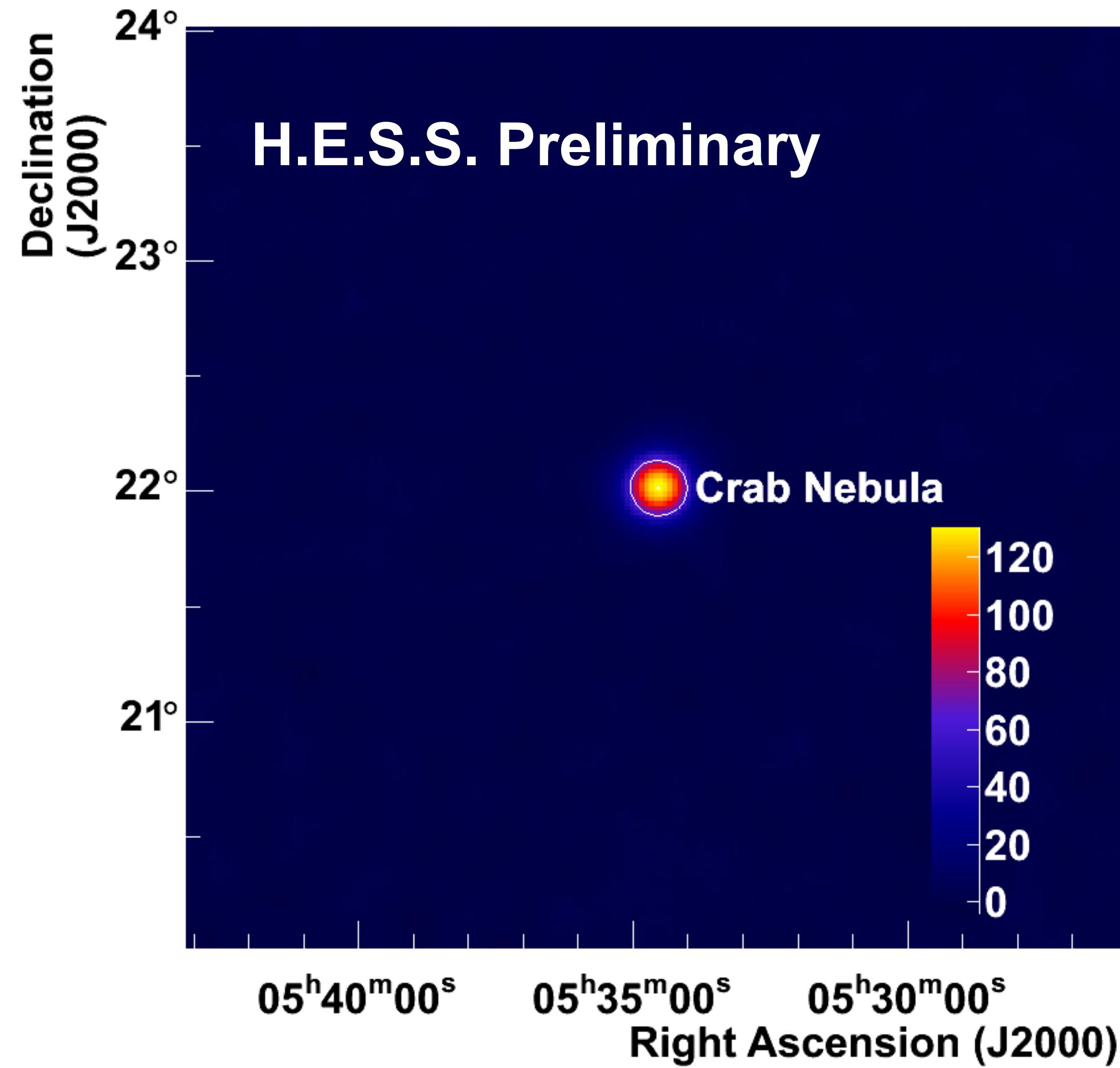




Significance Map



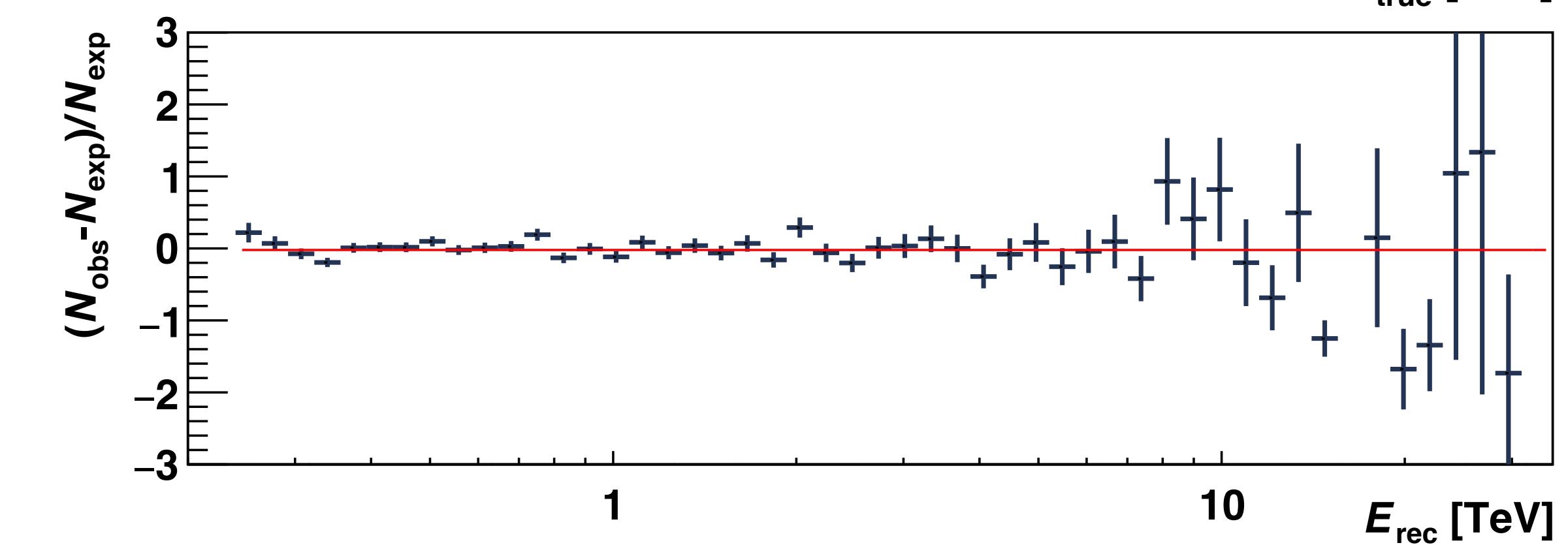
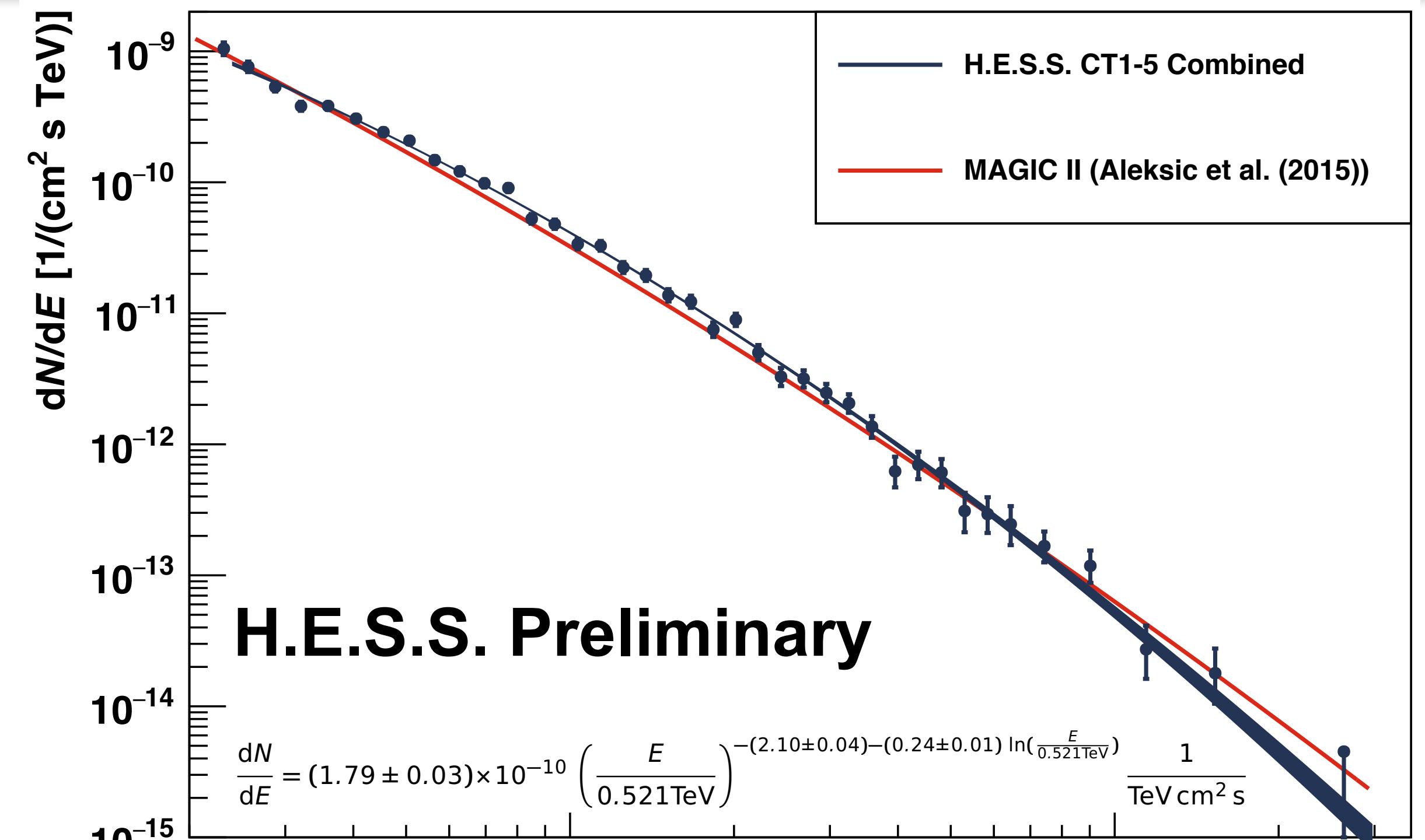
Significance Map



Energy Spectrum

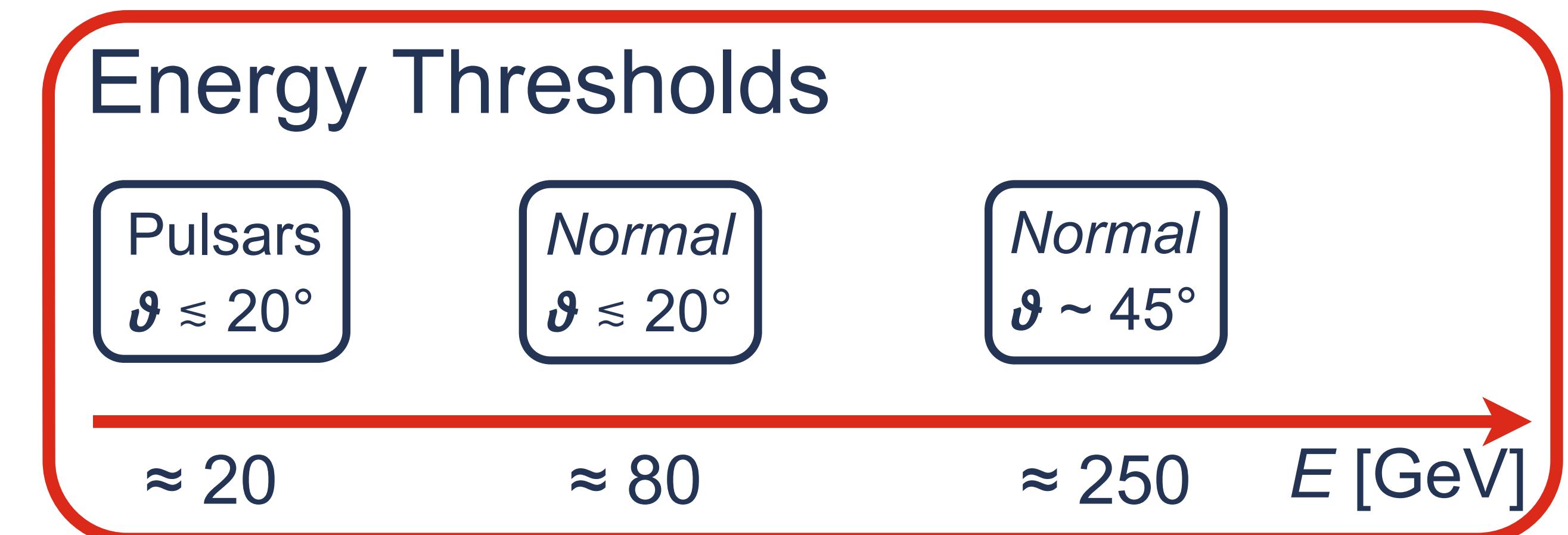
- Best fit: log parabola
 - stated errors purely statistical ones

- Energy threshold ≈ 230 GeV
 - H.E.S.S. I: ≈ 440 GeV
 - possible to go lower (systematics to be understood)



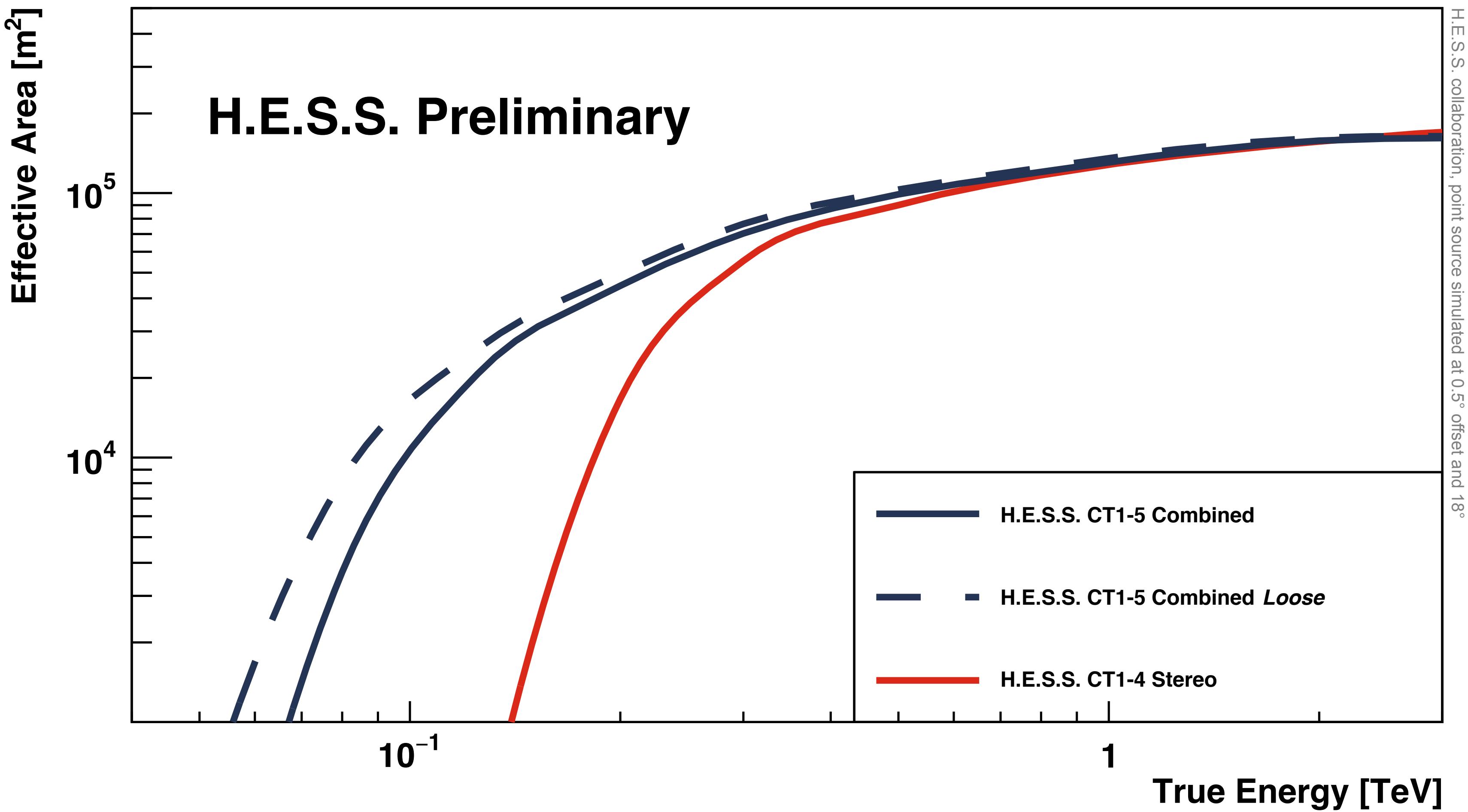
Performance Evaluation

- Plots correspond to low zenith angles ($\vartheta \lesssim 20^\circ$)
- Given for two analysis configurations
 - *Standard* (applicable to most sources)
 - *Loose* (lower energy threshold; possible for some sources, used for the Crab analysis)
- *Here*: Just showing configurations for *normal* analyses (no pulsar cuts)



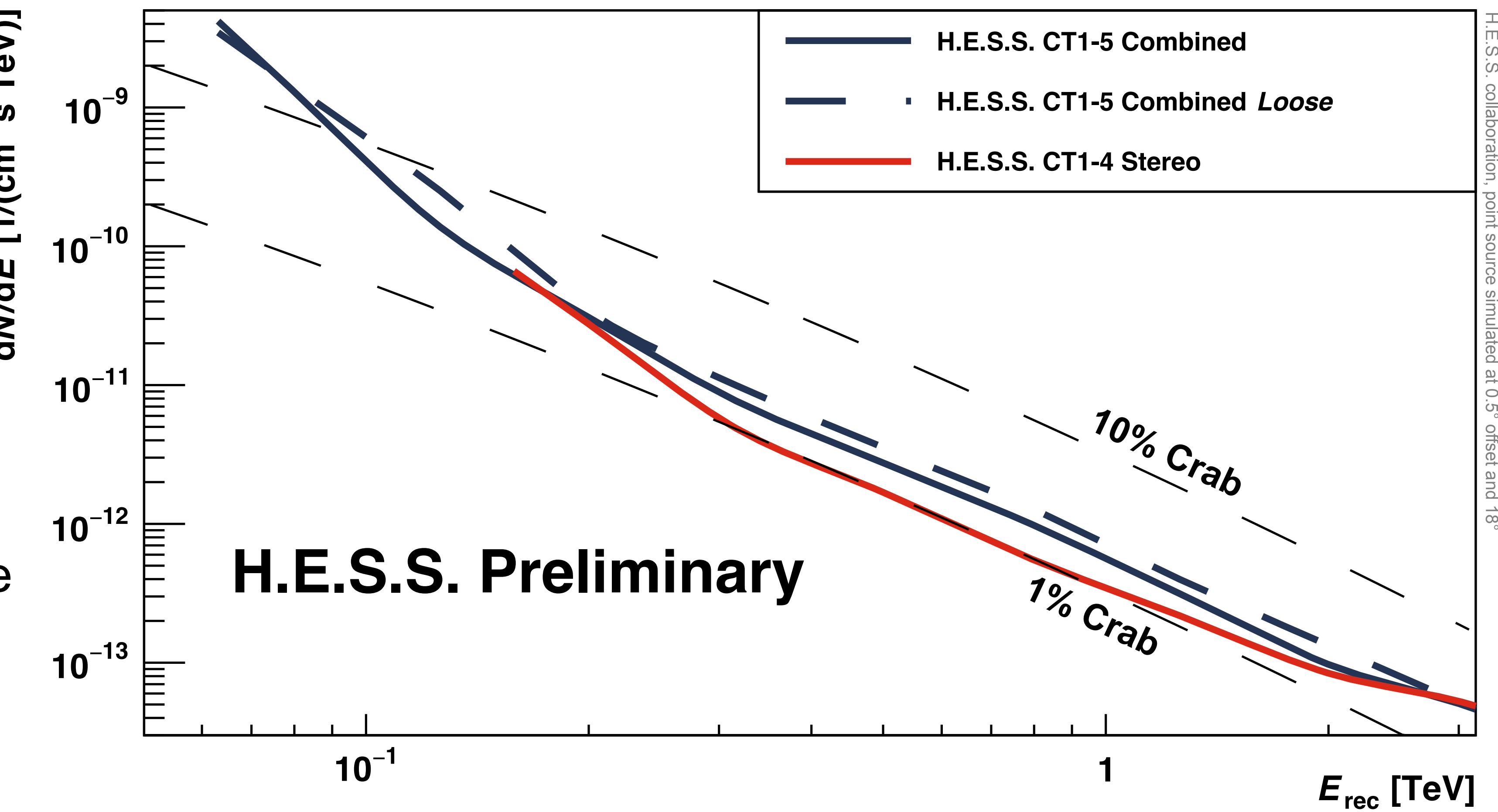
Effective Area

- After cuts
- Array benefits from CT5 at energies $\lesssim 300$ GeV



Differential Sensitivity

- Corresponding to:
 - 50 h
 - 5 bins per decade
 - $S/B \geq 0.05$ for each bin
- Using $N_{\text{exc}} / \sqrt{N_{\text{bkg}}}$ significance
- Crab reference spectrum from Aleksić et al. (2015)
- For complete analysis mode comparison see poster ID 565



Conclusions

- Successful combination of monoscopic and stereoscopic analysis modes of a hybrid IACT array
 - Providing very good results on the Crab Nebula
 - Publication planned (serving as H.E.S.S. II analysis and performance reference)
 - Related contributions: ID 565, 928, 978, and 1011

