INAF ISTITUTO NAZIONALE DI ASTROFISICA
NATIONAL INSTITUTE FOR ASTROPHYSICS
IASFPa Istituto di Astrofisica Spaziale e Fisica cosmica di Palermo

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Measurement of the FD vertical efficiency gradient

Coihueco – Heat preliminary results

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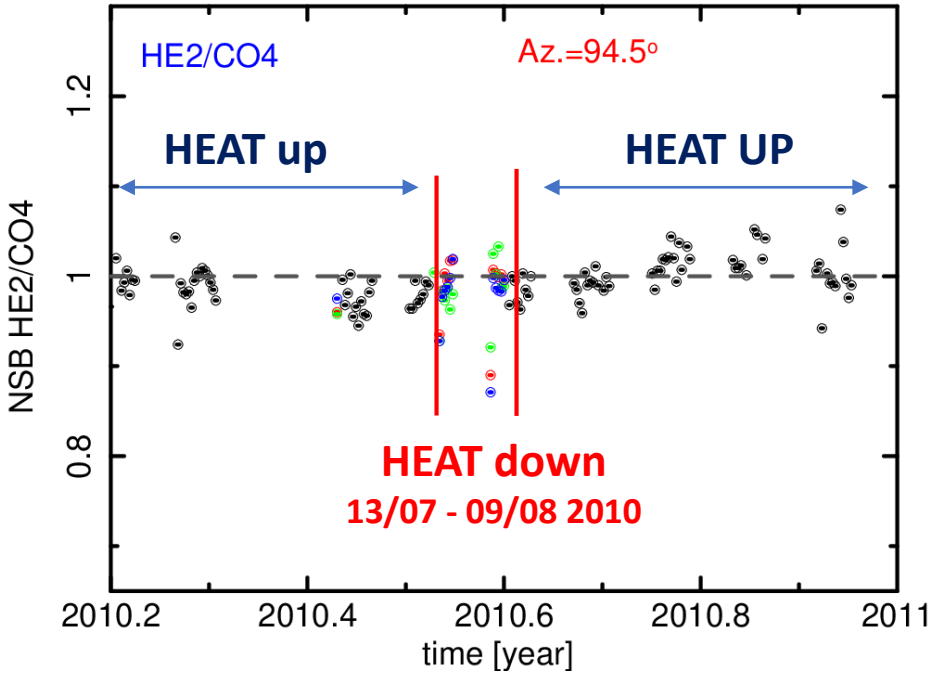
Introduction

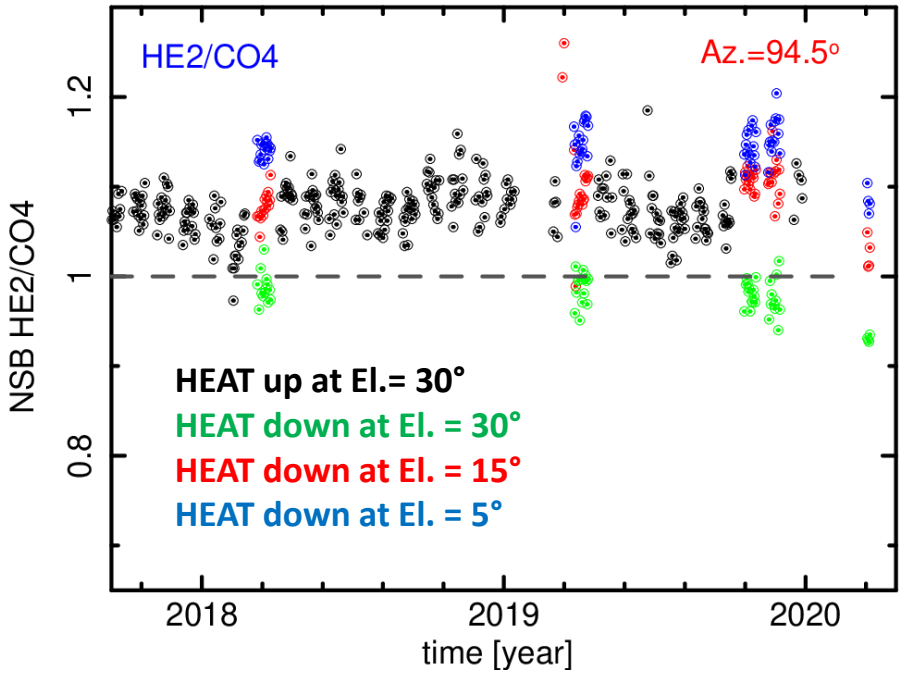
- Non uniform (from top to bottom) dust deposition on the FD mirrors may induce significative vertical gradient in the end-to end efficiency of the FD telescopes
- Mirror cleaning operations may introduce discontinuities in the cross-calibration of FD telescopes that depends on the elevation angle
- We exploit the data acquired by HEAT telescopes while in down position to measure the HE/CO NSB ratio as a function of the elevation angle and therefore verify the presence of gradients in the relative cross-calibration

NSB ratio between CO4 and HE2 (in up and down position)

First years of HEAT operation: perfect consistency between the NSB ratio in up/down position

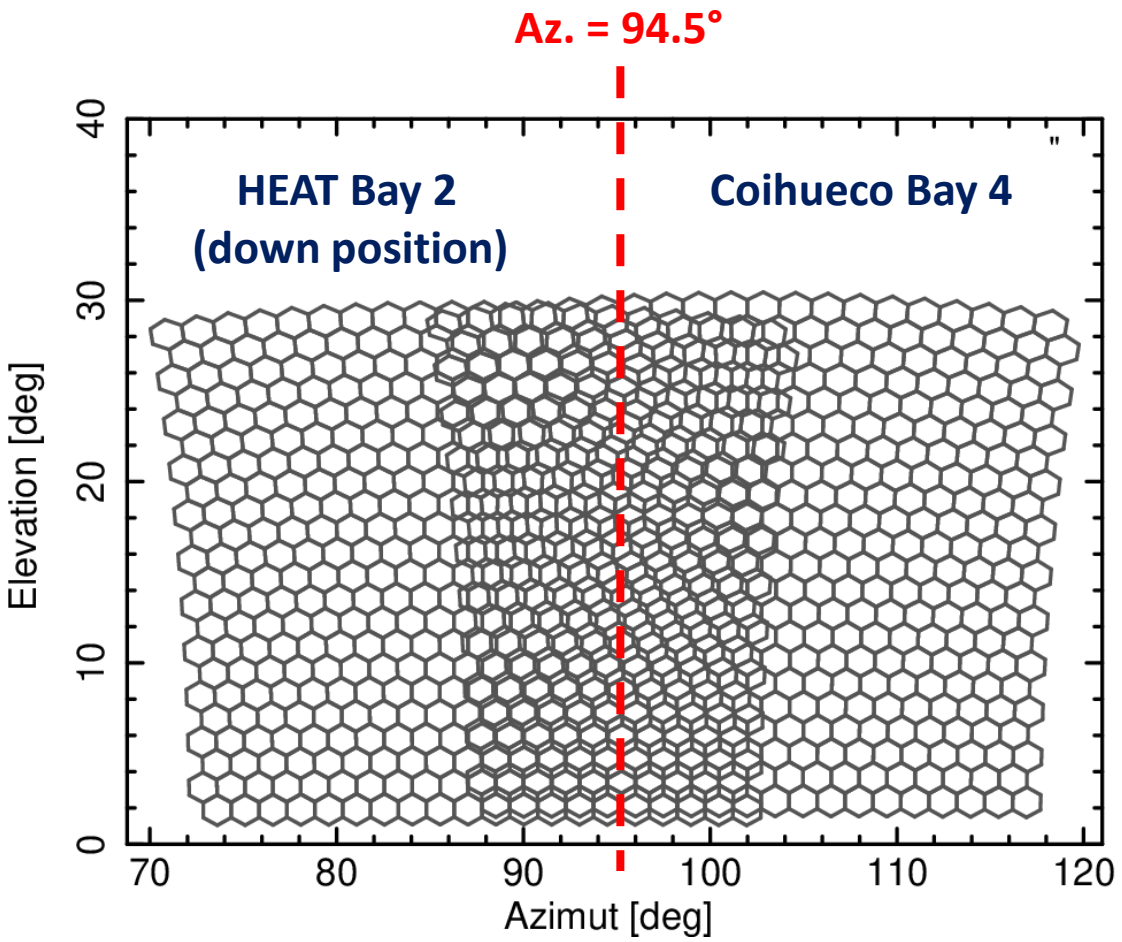


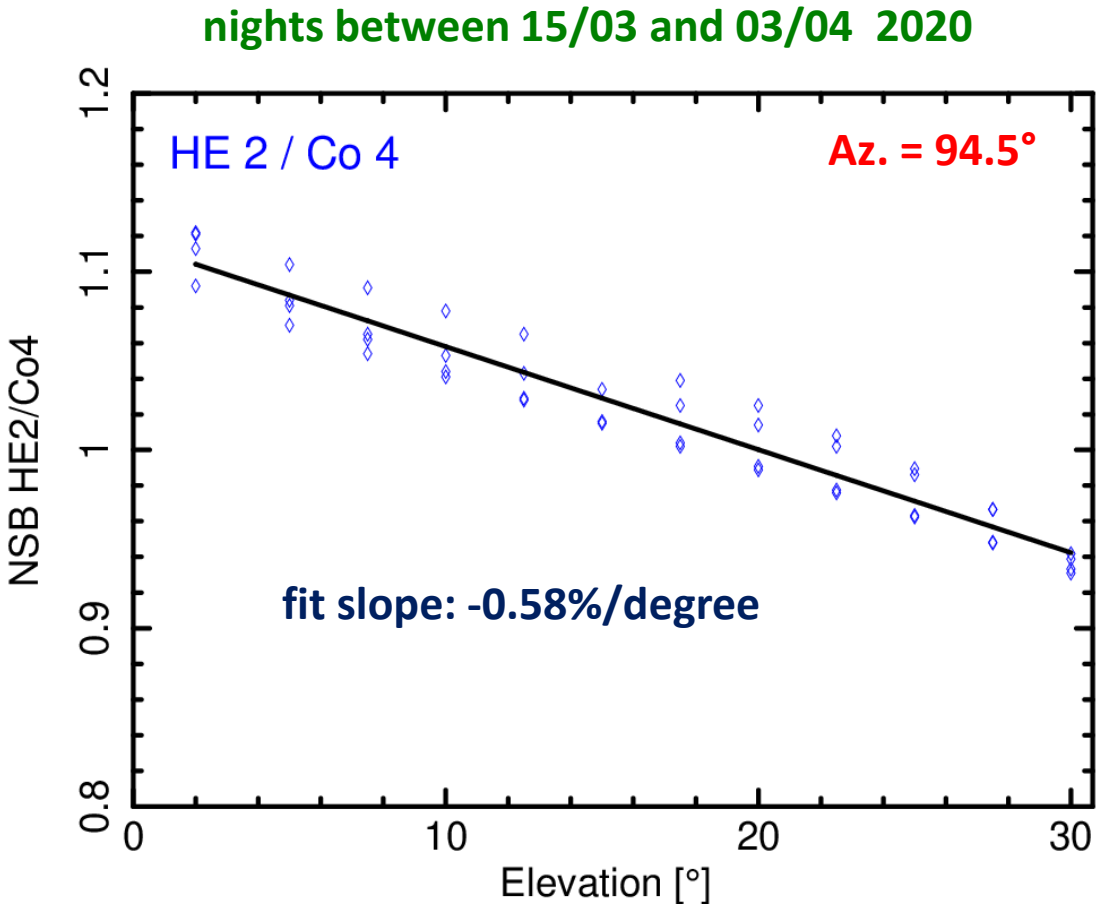
Recent years: significative discrepancy in the NSB ratio measured in up/down position



- When HEAT is in its nominal position, the NSB ratio can be measured only at 30° elevation (i.e. HEAT bottom rows vs. CO upper rows)
- When HEAT is in down position we can measure the NSB ratio at several elevation angles
- A spread of values in the NSB ratio measured at different elevation angles is a direct indication of a vertical gradient in the cross-calibration of the two telescopes

Efficiency gradient between HE2(down)/CO4





- The NSB ratio between HE2 (in down position) and CO4 measured as a function of the Elevation angle shows the presence of very significant gradient in their actual cross-calibration, resulting in a 16% mismatch between the efficiency of the pixels in the upper and lower camera rows

Conclusions

- By using the NSB ratio method we found that in the recent years there is a very significative vertical gradient in the HEAT bay 2 and Coihueco bay 4 inter-calibration that was not present in the first years of operation
- Cross-calibration methods based on the application of scaling factors obtained on camera “average” measurements would not produce good results
- For a proper cross-calibration of the FD telescopes it is mandatory to track in time the relative efficiency as a function of the elevation angle