The Moon as a Tool for the Calibration of HIRS

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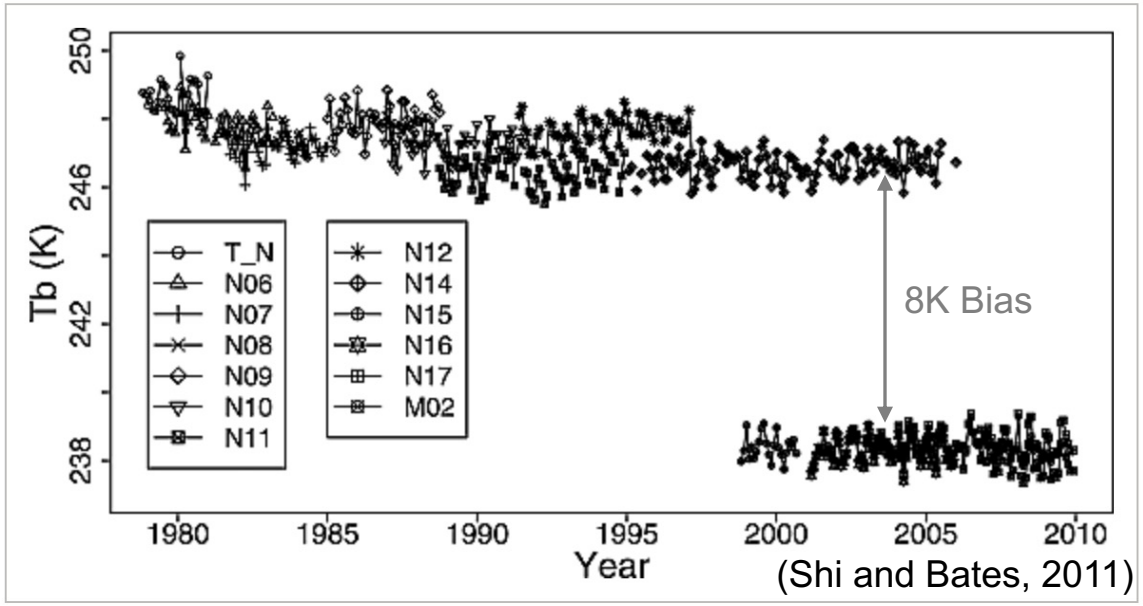
Motivation

Time series of HIRS UTWV brightness temperatures



(Shi and Bates, 2011)

Distinguishing changes on Earth from instrumental effects is the biggest challenge for deriving satellite climate data records.

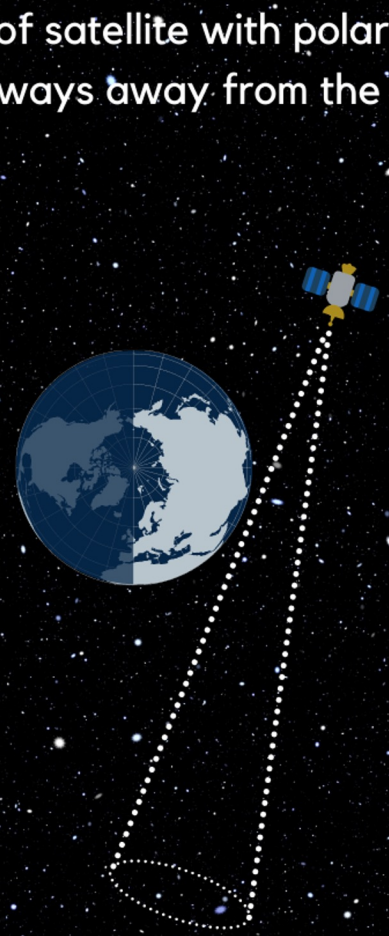
Important to correct intersatellite biases!

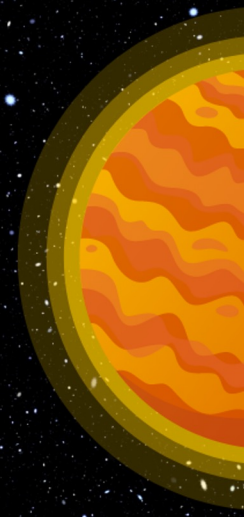
Possible to improve calibration of instruments using the moon

- Focus on **H**igh-resolution **I**nfrared **R**adiation **S**ounder **water vapor channel** at 6.5 μm, which is sensitive to UTWV

Calibration of HIRS

- Hot reference point = Internal Blackbody
- Cold reference point = **D**eep **S**pace **V**iew

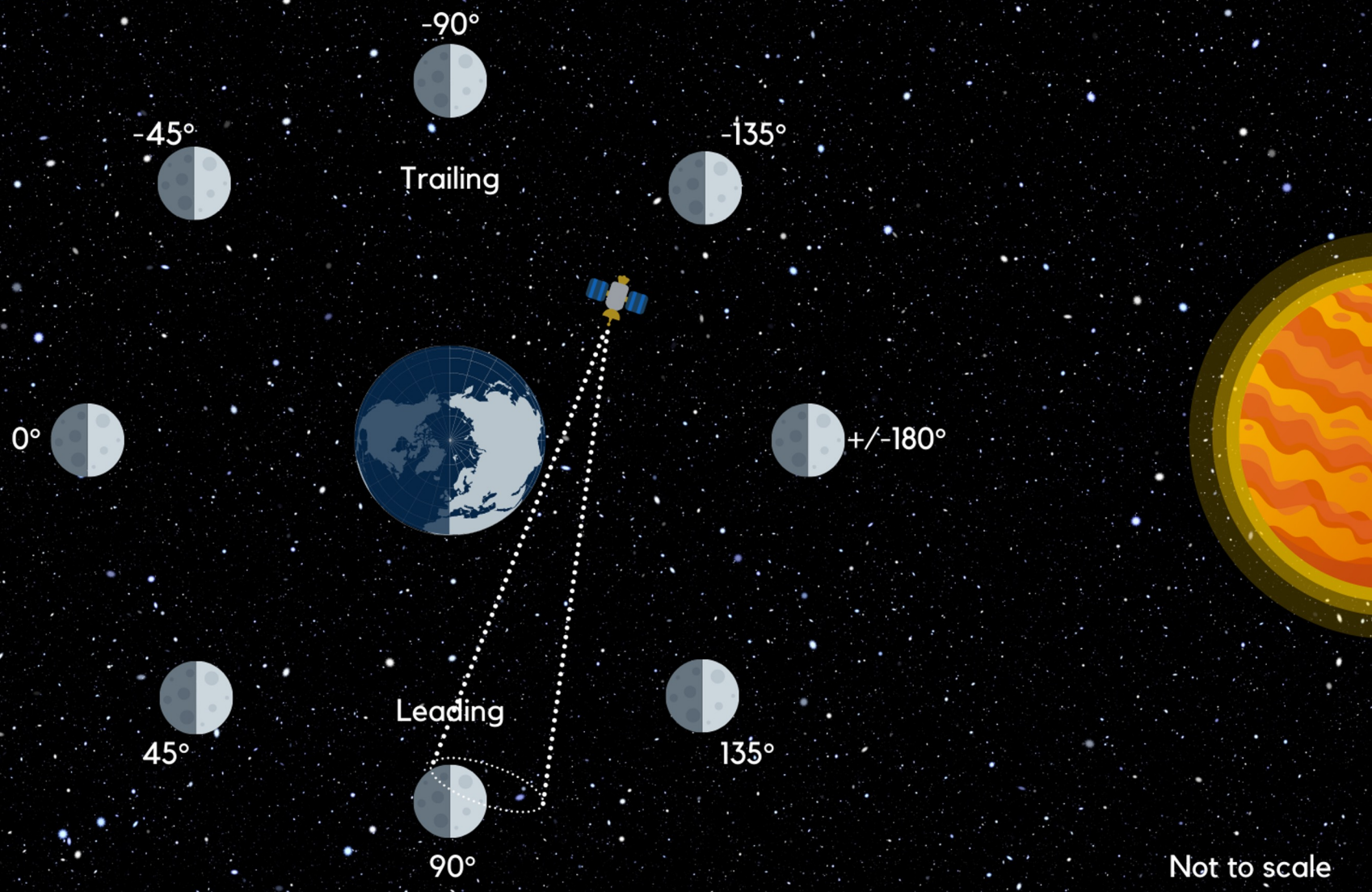




Not to scale

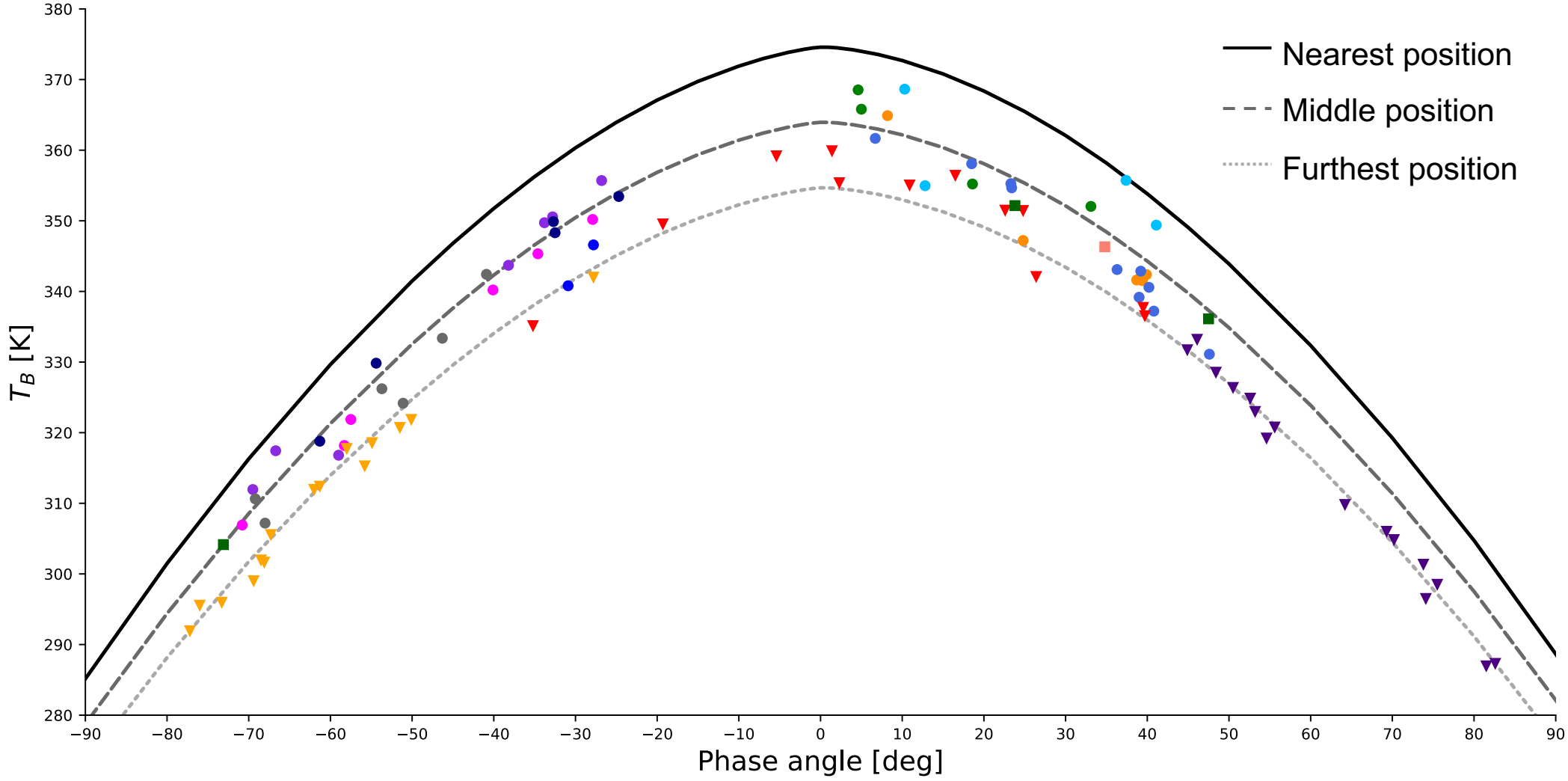
Moon in DSV of HIRS

- Possible to see Moon in DSV between -90° and +90°

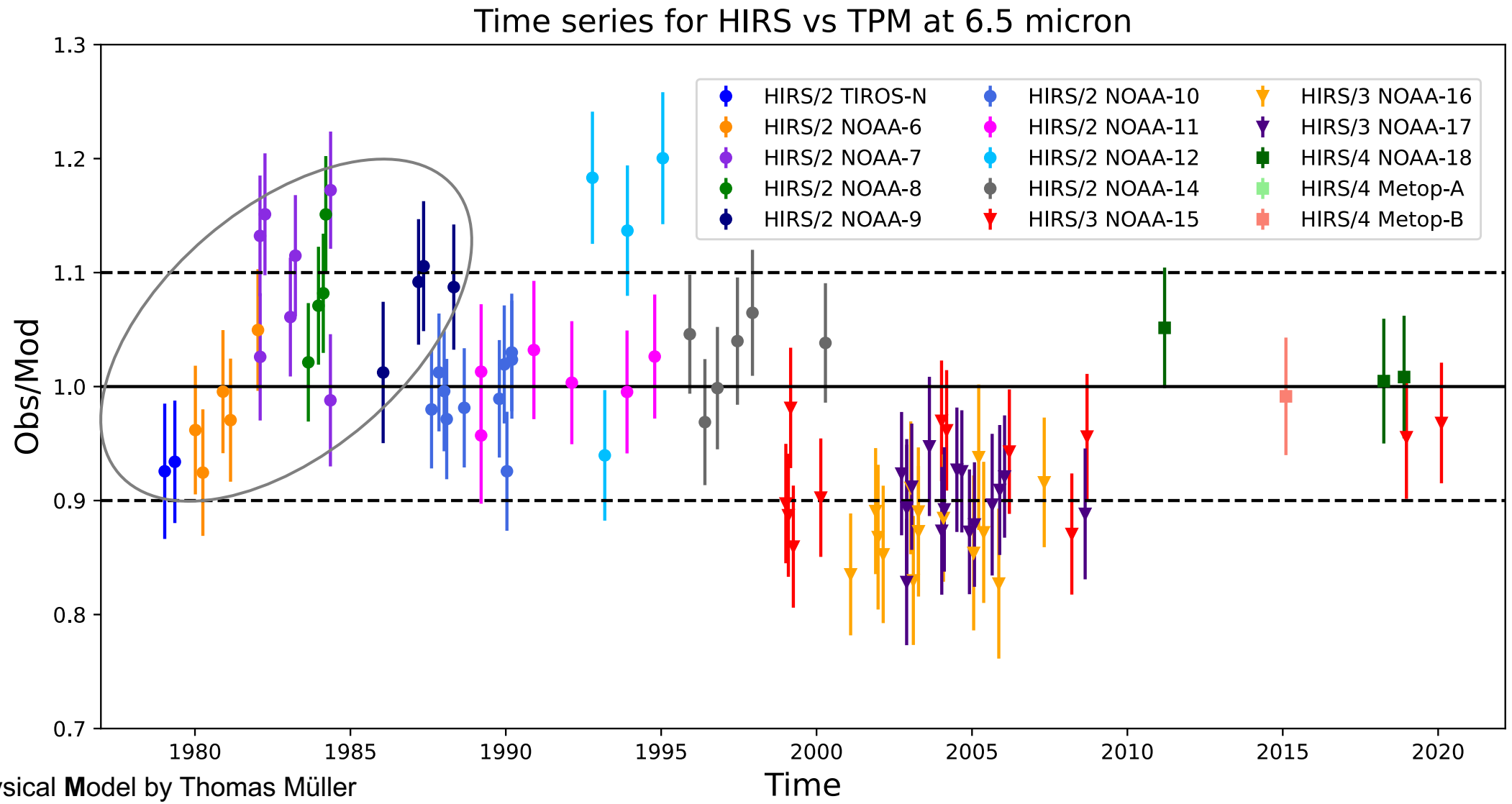


Moon observations and Model calculations

Thermo-**P**hysical **M**odel calculations for 3 possible positions of Earth & Moon to our Sun by Müller et al. (2020)



Stability analysis



Thermo-**P**hysical **M**odel by Thomas Müller

Conclusions

- Calibration with moon without spacecraft maneuvers
- Validation of measurements with TPM
- Detector characterization, e.g. stability analysis
- Future HIRS-like sensors without internal blackbody

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