MICROWAVE-RELATED RESEARCH STATUS AT UNIVERSITÄT HAMBURG

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MW-LUNA

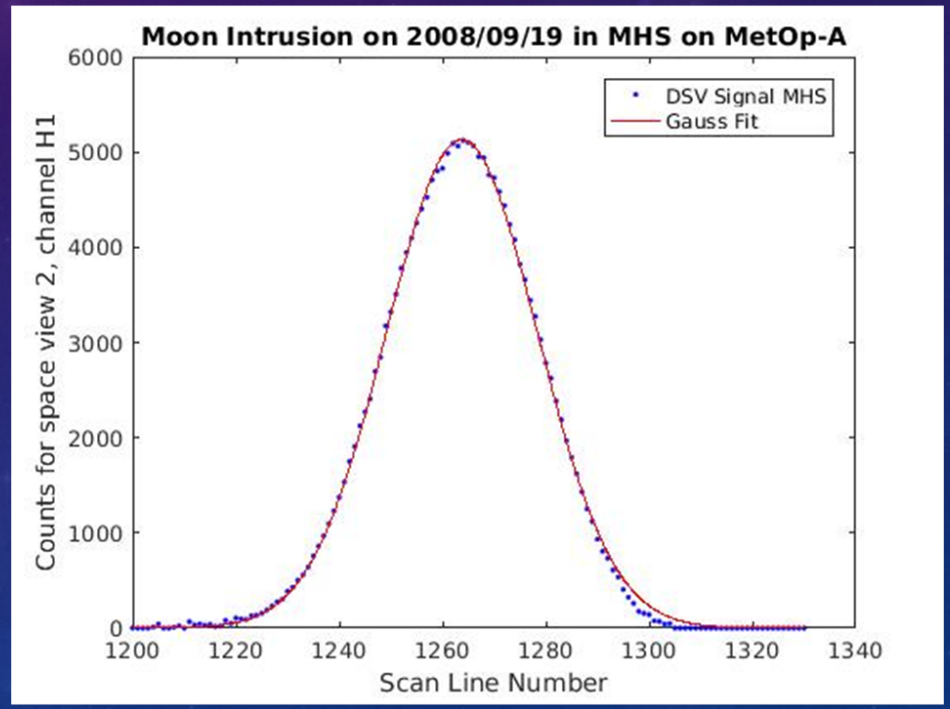
- Funding agency: Deutsche Forschungsgemeinschaft
- Time Span: September 2019 – August 2022
- Proposed by Stefan A. Buehler
- Title: Establishing the Moon as Reference for Climate Data From Microwave Instruments

SIGNAL FROM THE MOON IN THE DEEP SPACE VIEW

Gaussian Fit to Light Curve

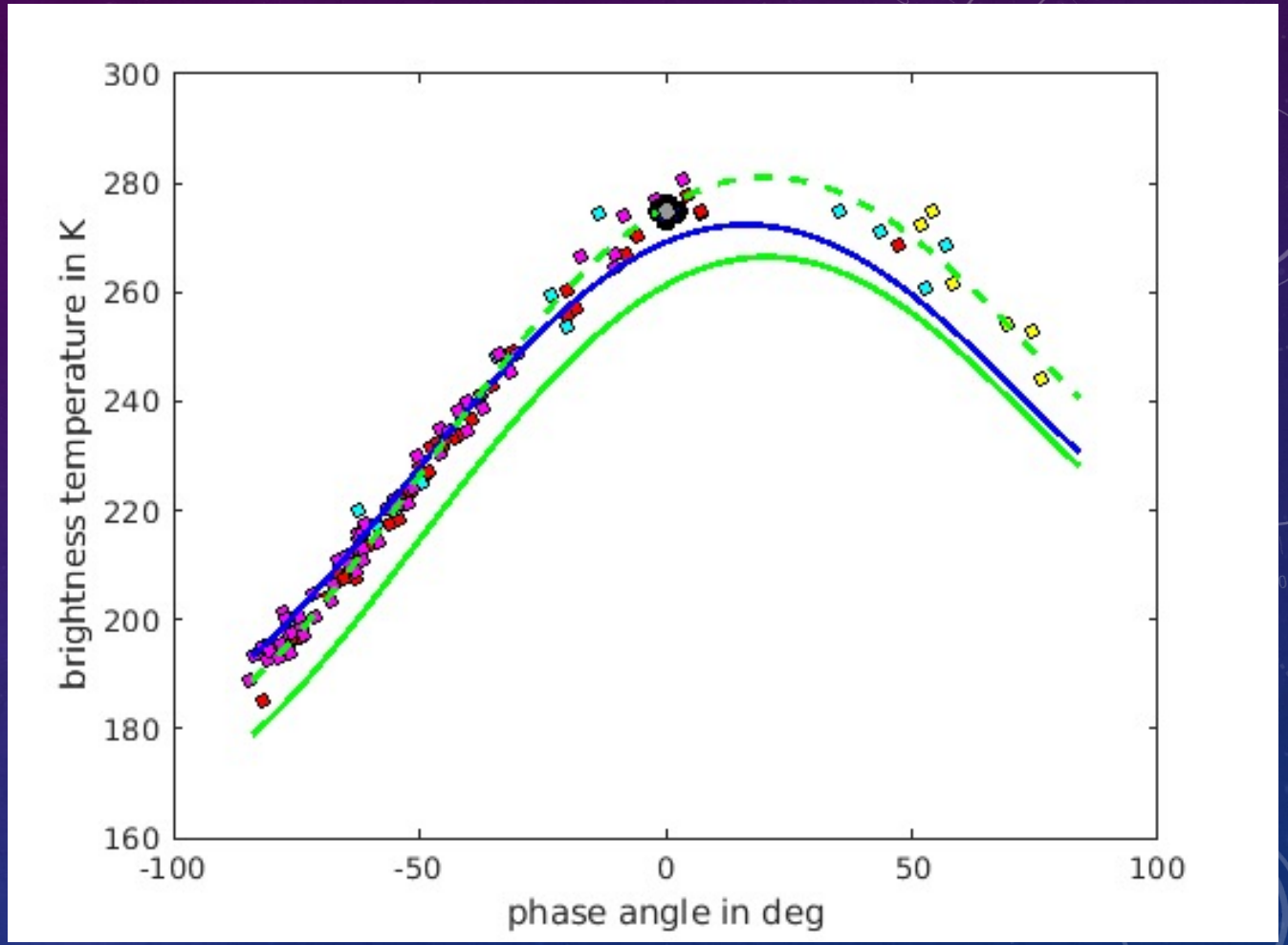
- Amplitude: radiometric cal.
- Position (scan & DSV no.): pointing direction
- FWHM: beamwidth
- Similar investigation with HIRS (Constanze Seibert)

Light Curve of Moon Intrusion



TASK 1: PREPARATORY WORK WORK PACKAGE 3: ANALYSIS OF ALL MOON INTRUSIONS IN THE DSV

- 394 observations of the Moon
- Light curve fitted with Gaussian
- Amplitude → brightness temperature
- Moon's apparent diameter, phase, distance to Sun, etc.
- Mainly MHS on NOAA-18 and -19

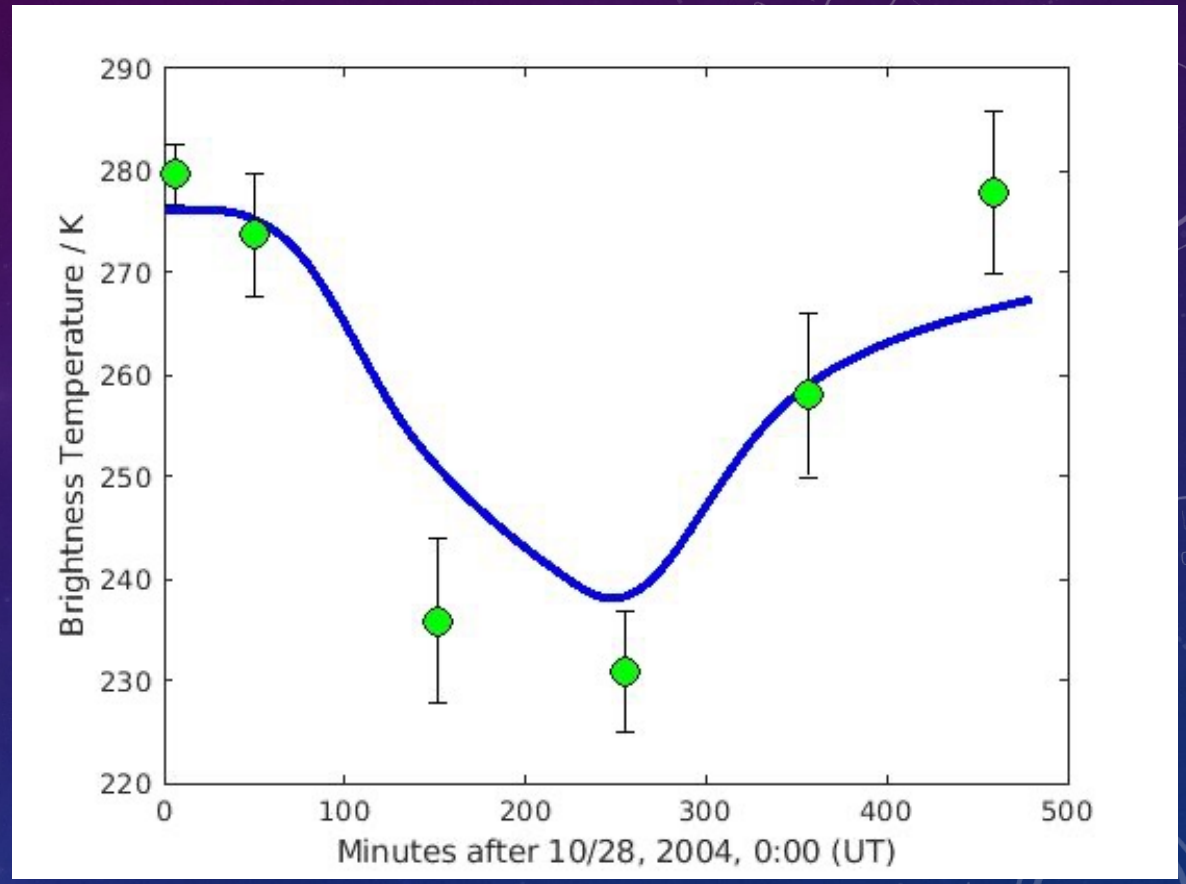


89 GHz, 0° means full Moon, green line model by Liu & Jin, 2021

Burgdorf et al., 2021

TASK 2: NEW MODEL OF LUNAR RADIANCE WORK PACKAGE 3: COMPARISON WITH A TOTAL ECLIPSE OF THE MOON

- Eclipse on Oct 28, 2004, was observed with AMSU-B on NOAA-15
- Only eclipse observed at 183 GHz
- Radiance from upper 10 cm → check assumptions made in model
- Satisfactory agreement within one-sigma error bars

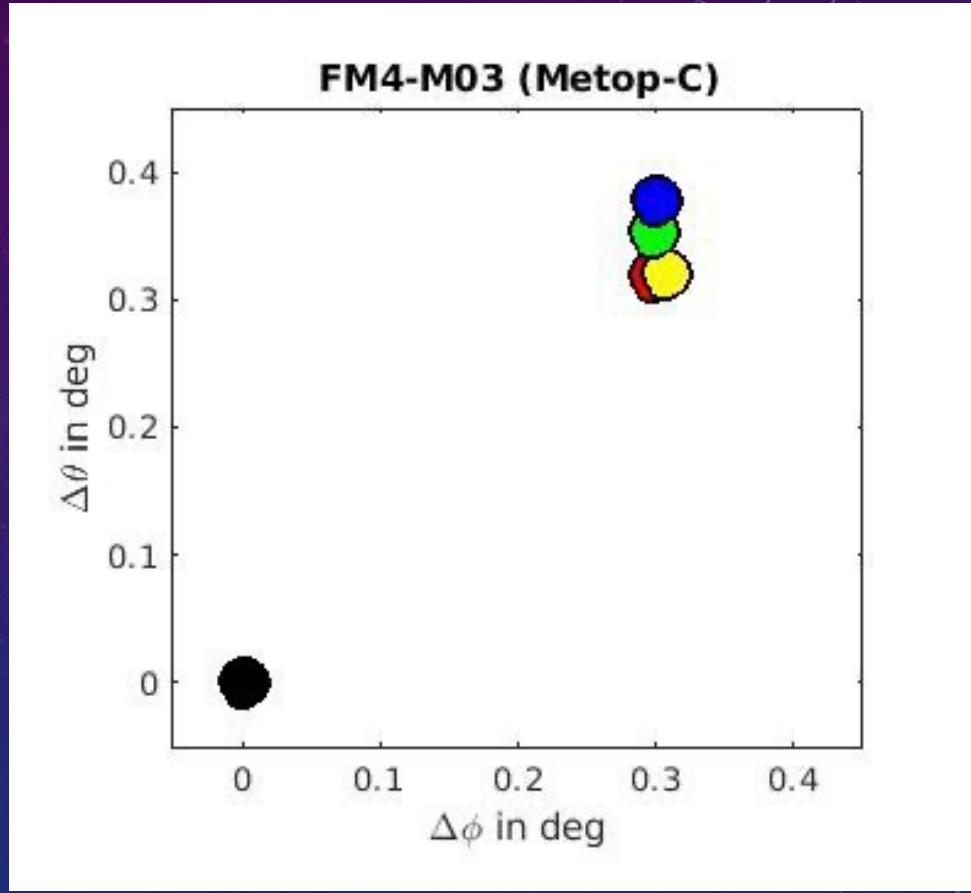


183 GHz, eclipse with AMSU-B

Draft paper written

TASK 3: APPLICATION OF THE NEW LUNAR MODEL WORK PACKAGE 1: CALIBRATION CHECK OF MICROWAVE INSTRUMENTS

- Pointing error
- Beam size
- Discrepancy with results from ground tests (EUMETSAT web pages)
- Non-compliance with requirements

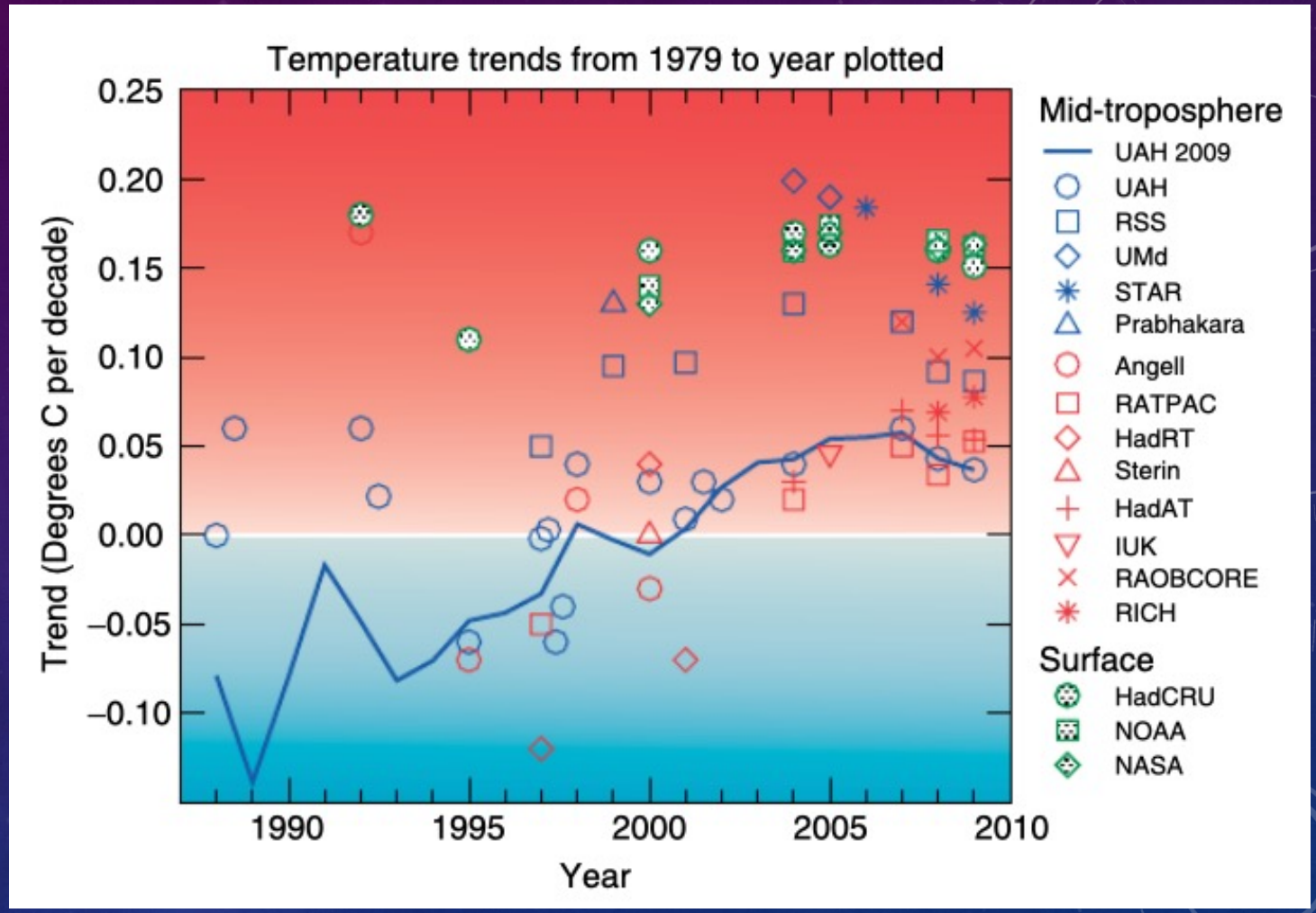


Black: actual position of Moon, color-coded channels

Burgdorf et al., 2021

REMAINING TASKS AND MW-LUNA 2

- Systematic calibration changes over time?
- Does UTH change over time?
- Can Moon replace blackbody?
- AMSU-A next
- Check of stability of offset
- Relevant for temperature trend



Thorne et al., 2011