SARA Online
Drake's Lounge Meeting
17 May 2026

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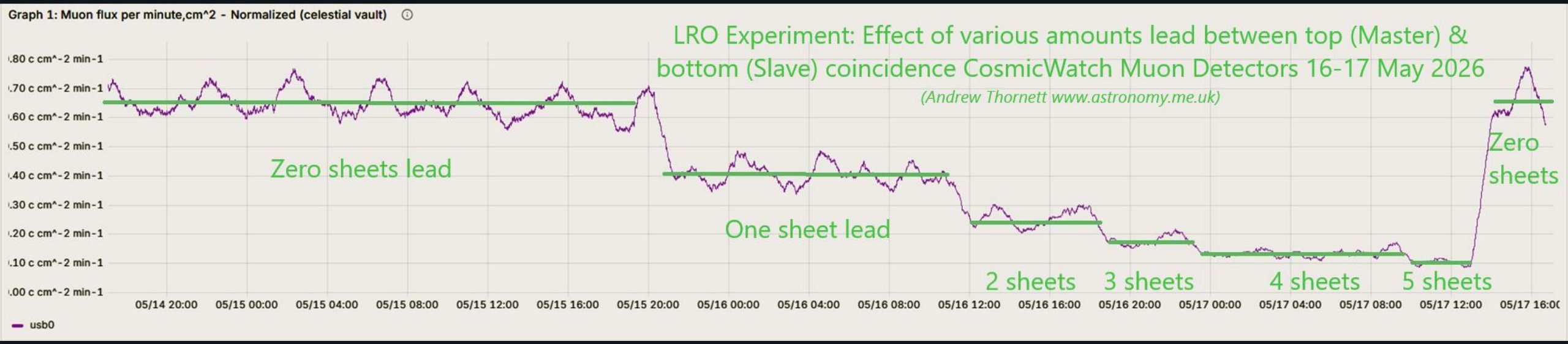
E-mail via the "Contact Me" page on the above website.

LRO Experiment to test effect of placing various amounts of lead between two x UKRAA CosmicWatch Muon Detectors in coincidence mode 16-17 May 2026

Experiment recommended at last SARA online meeting. Here are results with 0→5 sheets lead.


Graph 1: Muon flux per minute,cm^2 - Normalized (celestial vault)
LRO Experiment: Effect of various amounts lead between top (Master) & bottom (Slave) coincidence CosmicWatch Muon Detectors 16-17 May 2026
(Andrew Thornett www.astronomy.me.uk)
Zero sheets lead
One sheet lead
2 sheets
3 sheets
4 sheets
5 sheets
Zero sheets
.80 c cm^-2 min-1
.70 c cm^-2 min-1
.60 c cm^-2 min-1
.50 c cm^-2 min-1
.40 c cm^-2 min-1
.30 c cm^-2 min-1
.20 c cm^-2 min-1
.10 c cm^-2 min-1
.00 c cm^-2 min-1
05/14 20:00
05/15 00:00
05/15 04:00
05/15 08:00
05/15 12:00
05/15 16:00
05/15 20:00
05/16 00:00
05/16 04:00
05/16 08:00
05/16 12:00
05/16 16:00
05/16 20:00
05/17 00:00
05/17 04:00
05/17 08:00
05/17 12:00
05/17 16:0
usb0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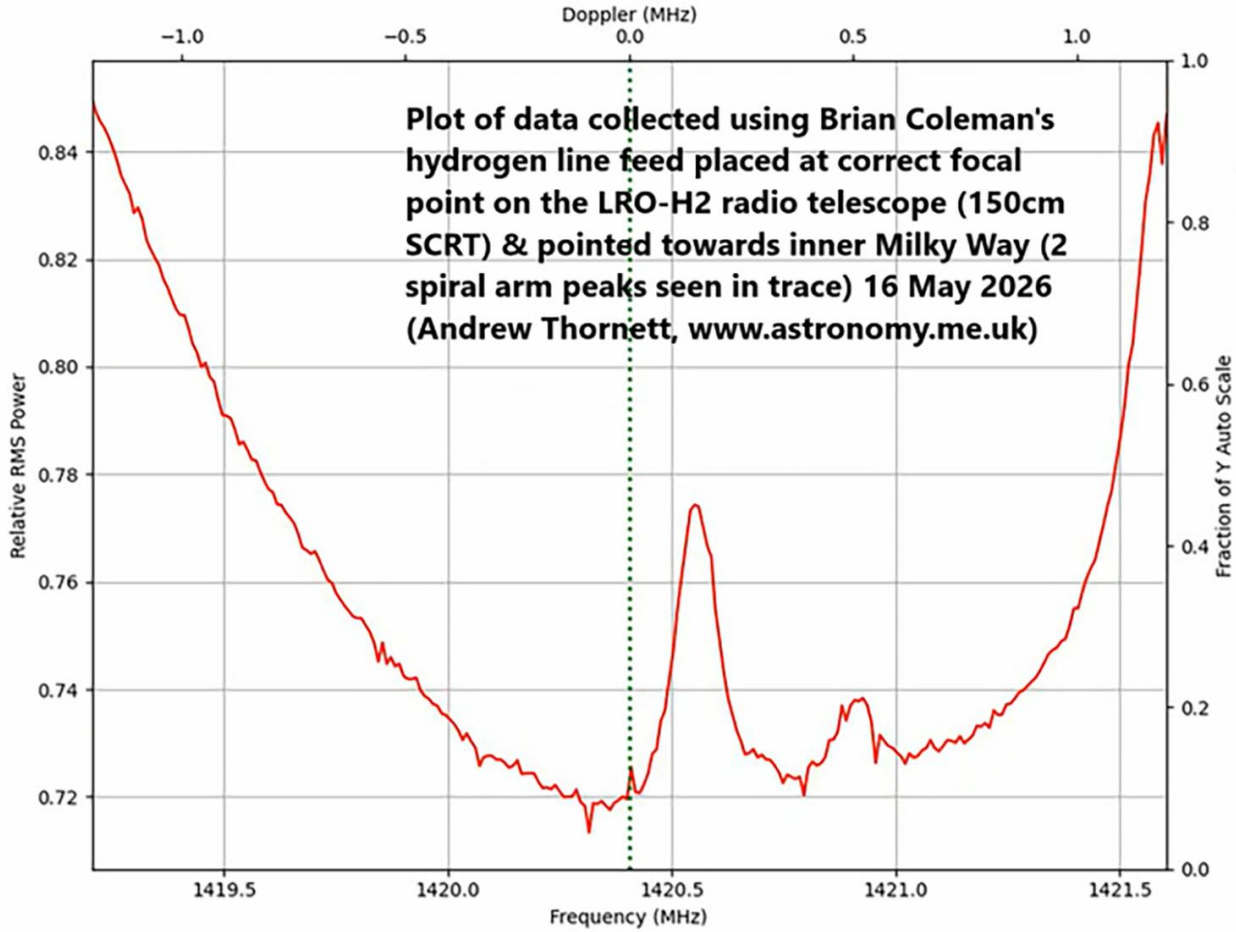
05/16 12:00
05/16 16:00
05/16 20:00
05/17 00:00
05/17 04:00
05/17 08:00
05/17 12:00
05/17 16:0
usb0

Plot data Brian Coleman H-Line feed placed @ *(I think..)* correct focal point on LRO-H2

ezRA - Easy Radio Astronomy Data Collector - ezCol250228a.py



LRO-H2_Monopole1_Az_178_
Latitude 52.7
Longitude -1.8
Amsl 81

FreqCtrRef 1417.405000
FreqCtr 1420.405000
FreqMin 1419.205000
FreqMax 1421.605000

LRO-H2_Monopole1_Az_178_260516_00.txt
File SampleQty 164

2026-05-16 04:38:44 UTC
2026-05-16 05:38:44 PC

AzDeg 178.0 | 178.0
ElDeg 48.0 | 48.0

○ AzEl ○ RaDec ○ GLatGLon

FreqBinQty 256
Gain 49.6
Integration 101.6 sec

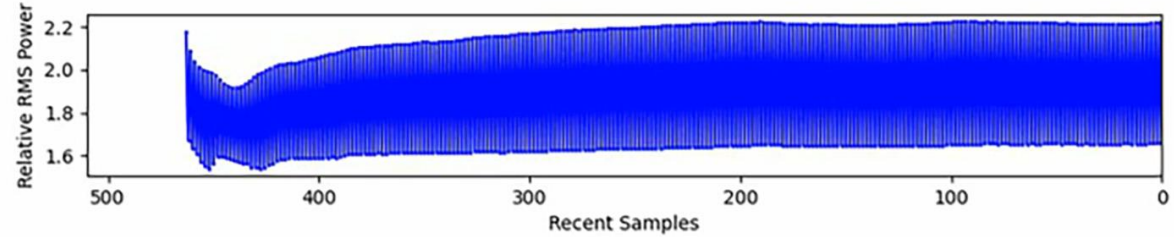
New Plot | New File

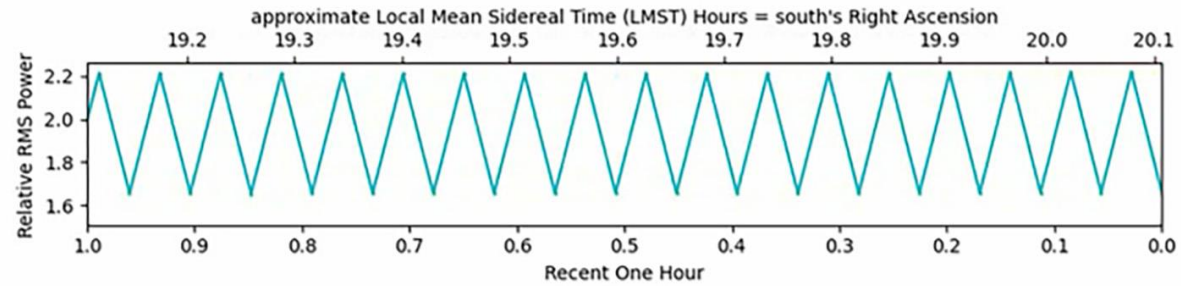
○ Off ● RefDiv ○ RefSub

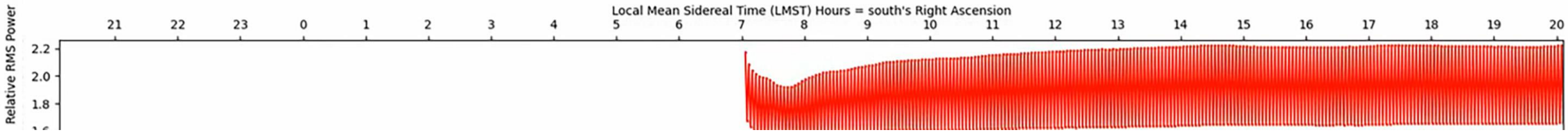
● To File ○ Idle ○ Exit

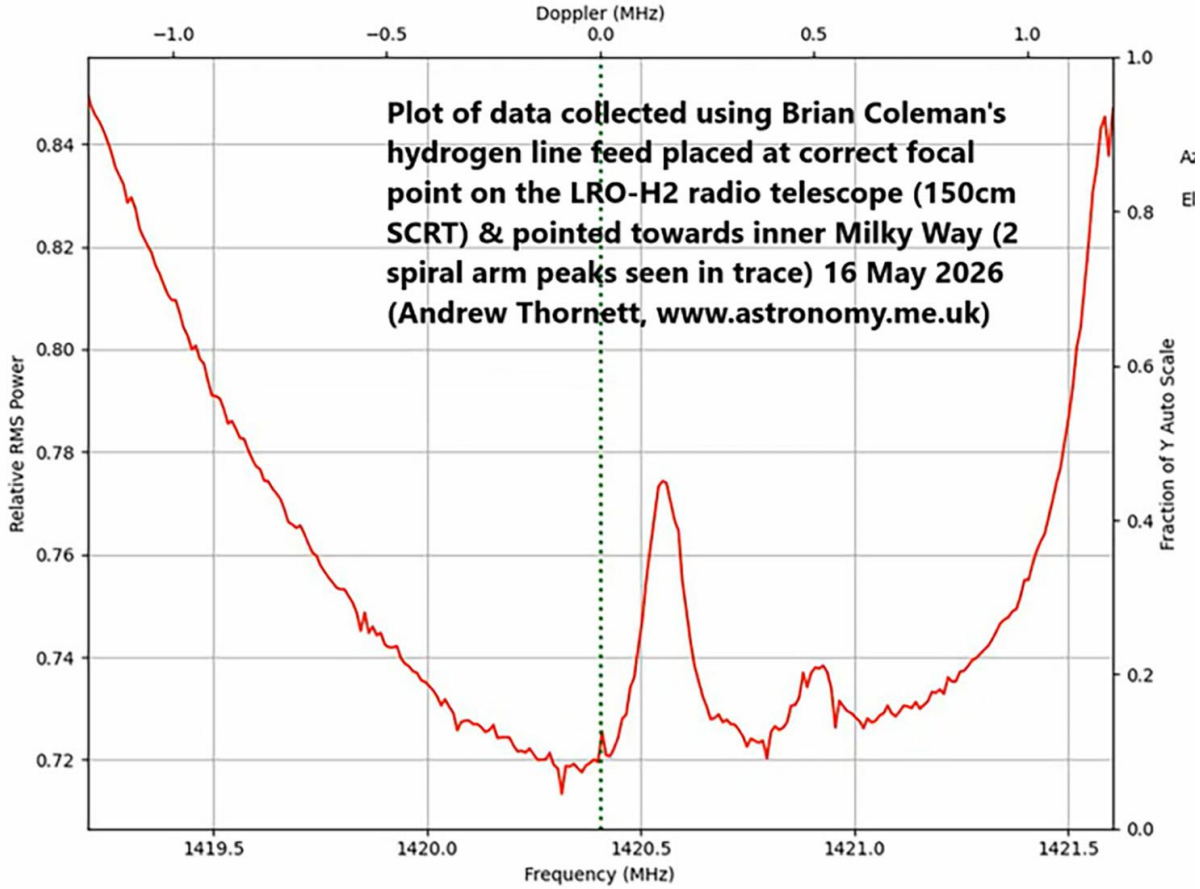
ezColIntegQty 550000

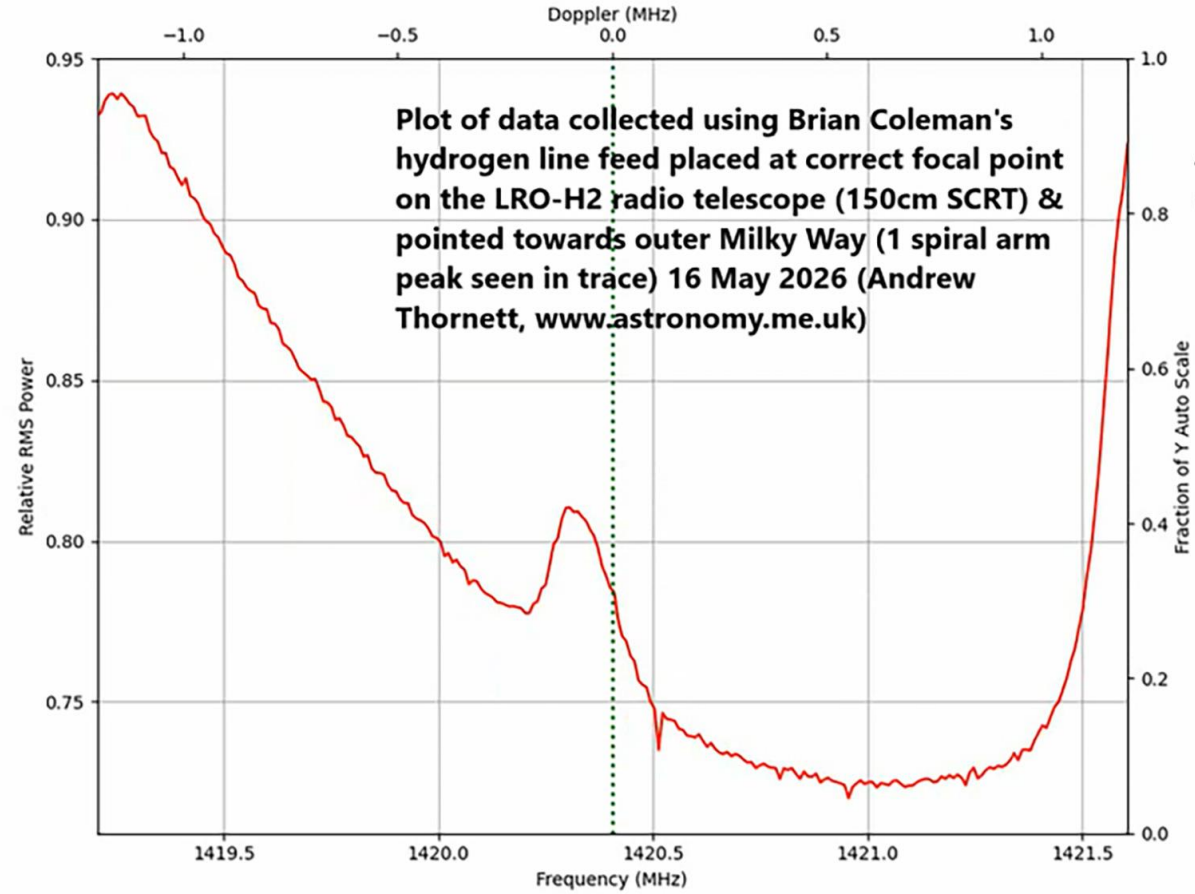
Fraction of Y Auto Scale, Min and Max 0.0 1.0








Doppler (MHz)
−1.0
−0.5
0.0
0.5
1.0
Plot of data collected using Brian Coleman's hydrogen line feed placed at correct focal point on the LRO-H2 radio telescope (150cm SCRT) & pointed towards inner Milky Way (2 spiral arm peaks seen in trace) 16 May 2026 (Andrew Thornett, www.astronomy.me.uk)
Relative RMS Power
0.84
0.82
0.80
0.78
0.76
0.74
0.72
Fraction of Y Auto Scale
1.0
0.8
0.6
0.4
0.2
0.0
1419.5
1420.0
1420.5
1421.0
1421.5
Frequency (MHz)


Doppler (MHz)
−1.0
−0.5
0.0
0.5
1.0
Plot of data collected using Brian Coleman's hydrogen line feed placed at correct focal point on the LRO-H2 radio telescope (150cm SCRT) & pointed towards outer Milky Way (1 spiral arm peak seen in trace) 16 May 2026 (Andrew Thornett, www.astronomy.me.uk)
Relative RMS Power
0.95
0.90
0.85
0.80
0.75
Fraction of Y Auto Scale
1.0
0.8
0.6
0.4
0.2
0.0
1419.5
1420.0
1420.5
1421.0
1421.5
Frequency (MHz)

Comment from Jason

Hi Andy,

Back of the napkin calculations put you at around 0.63 dB above background for the first and about 0.54 dB for the second. That's about half what I would expect (and consistent with your earlier results). I would suggest the next thing to try is cover the inner surface with aluminum window screening and see if that helps. My guess is that the steel is a very lossy reflector at 21cm. One modification at a time, we're going to optimize your system!

Cheers!

Any thoughts on how to improve reception?

Ideas I have had so far:

- Extend edge of dish to reduce ground spillover (aka Alex) – I have some mosquito mesh ready for purpose.
- Confirm I really do have the feed at correct distance from dish centre.
- Try moving feed slightly to sides by pulling on ropes whilst watching computer screen to check properly centralised.
- Once confirmed at focal point, replace metal supports with wooden or plastic supports.
- *Possibly cover steel dish with aluminium mosquito screen? However, mixed results on line about this with some sources suggesting aluminium no significant improvement over steel of dish.*
- *Dish is painted with Hammerite metal-protective paint – do you think that matters? Again, my online searches suggest it should not make a difference.*