The Mopra CO Survey: a brief update from Armagh

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ARMAGH OBSERVATORY & PLANETARIUM
EXPLORING THE COSMOS SINCE 1790

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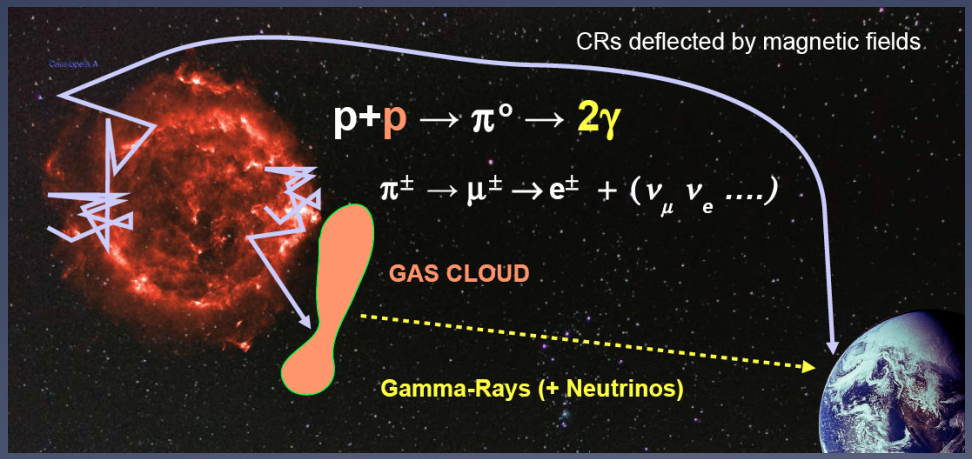
THE UNIVERSITY OF NEW SOUTH WALES

Synopsis

1. Mopra CO Survey Update
2. CTA-UK Outreach Programme

Producing the "template" for the CTA Galactic Plane survey



Mopra CO Survey Specs

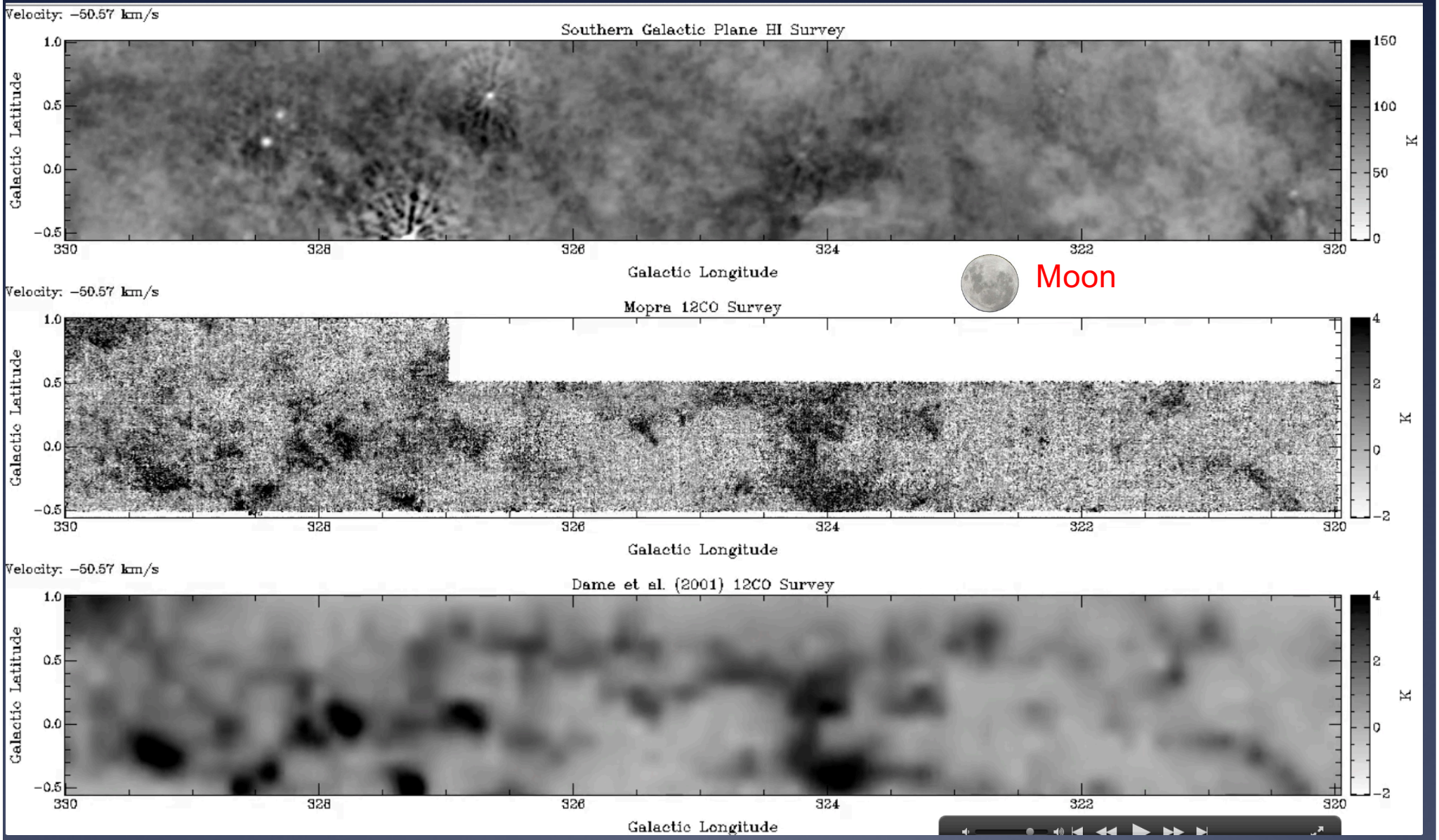
- Lines: ^{12}CO, ^{13}CO, $C^{18}O$, [$C^{17}O$] J=1-0
- Longitude *l*: +250° to +11° (i.e. 121°)
- Latitude *b*: -1° to +1° (i.e. 2°)
  - plus selected extensions for CMZ, HESS Sources
- 0.6 arcmin + 0.1 km/s resolution, over 1000 km/s
- *~250 sq. degrees of the Southern Galactic Plane*
- Observing completed! *Vale Mopra…..*
- Data reduction mostly done…..

Burton et al, 2013, "The Southern Galactic Plane CO Survey", PASA, 30, 44

HI, ^{12}CO Mopra and ^{12}CO Columbia

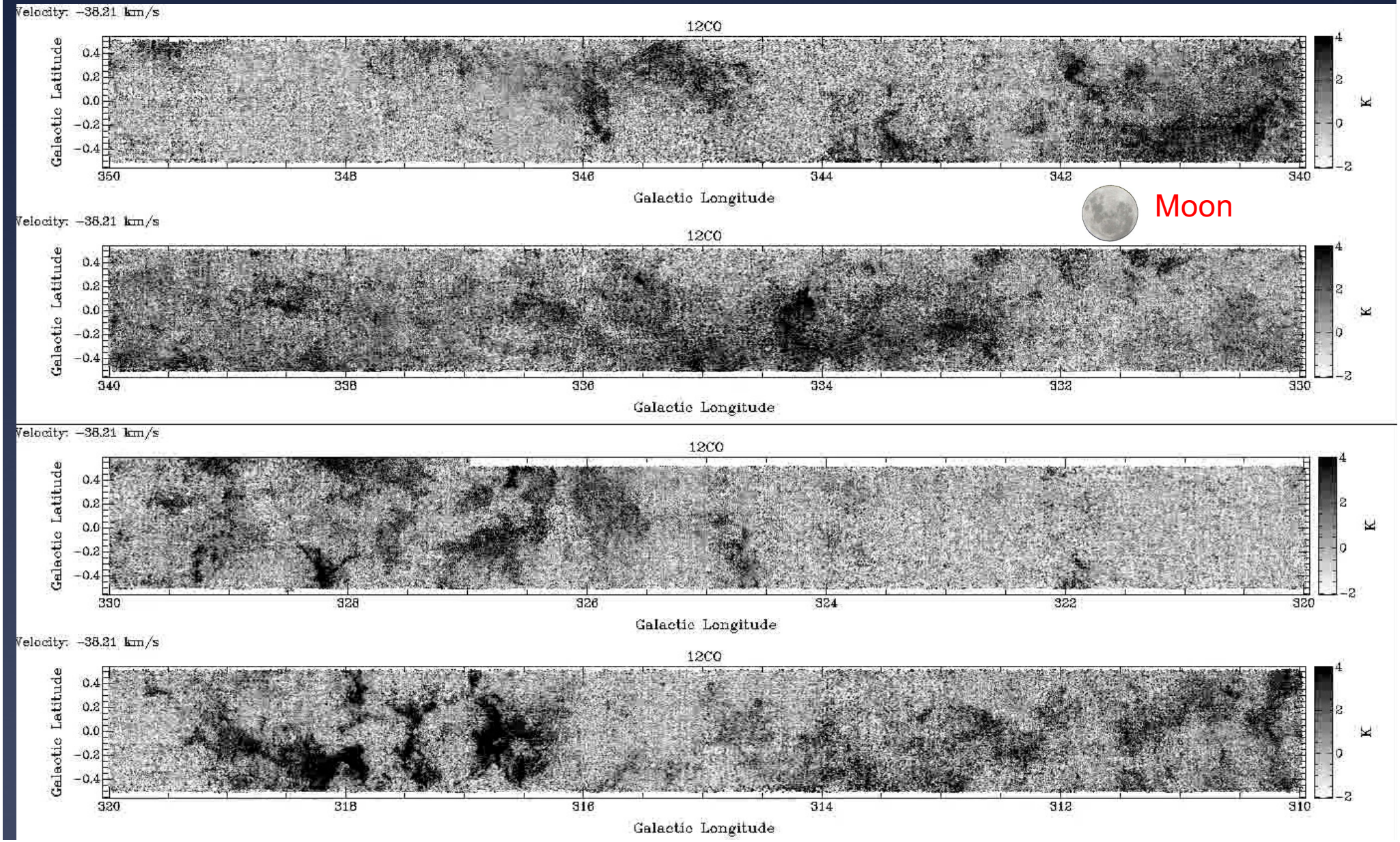
0.6 vs. 9 arcmin *and* 0.1 vs. 1 km/s

Braiding et al. 2015, PASA, 32, e020



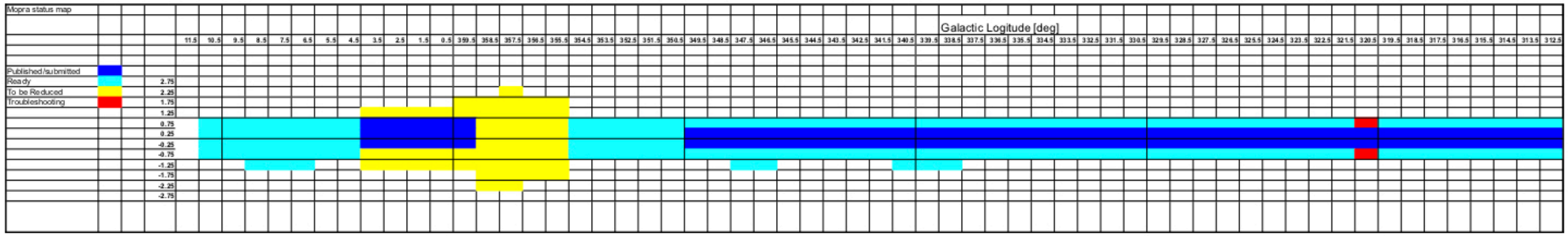
40° of the Galaxy: *l*=310°– 350°

Braiding et al. 2018, PASA, 35, e029

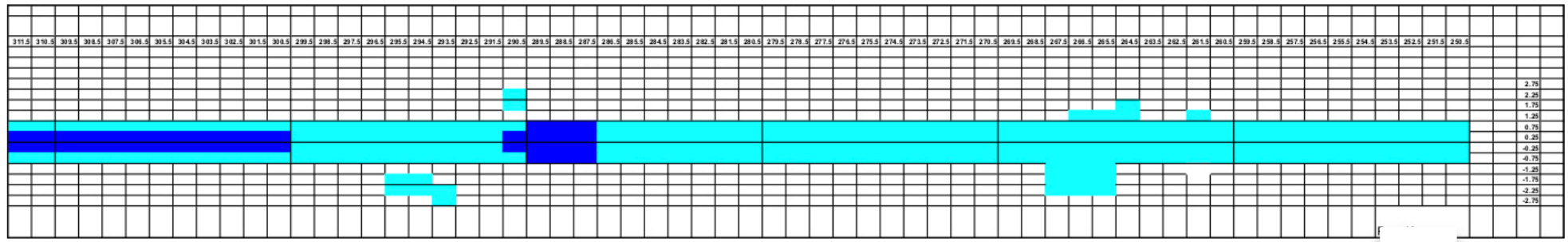


Survey Status

l= +11º 0º 312º



+311º 250º



b = +/– 1º

	Published
	Reduced
	To be Reduced
	Trouble Shooting

Mopra CO Survey Papers

1. Burton et al, 2013, *The Mopra Southern Galactic Plane CO Survey*, PASA, 30, e044
   - 323°, ±0.5°, [DR0]
2. Braiding et al, 2015, *The Mopra Southern Galactic Plane CO Survey – Data Release 1*, PASA, 32, e020
   - 320°–330° ±0.5°, DR1
3. Rebolledo et al, 2016, *The Carina Nebula and Gum 31 molecular complex: I. Molecular gas distribution, column densities and dust temperatures*, MNRAS, 456, 2406.
   - ~287°–290°, ±1°, [DR2]
4. Braiding et al, 2018, *The Mopra Southern Galactic Plane CO Survey – Data Release 3*, PASA, 35, e029
   - 300°-350°, ±0.5°, DR3
5. Blackwell et al, 2020, *The Mopra Central Molecular Zone Carbon Monoxide Isotopologue Survey. I: Techniques and First Results*, PASA, submitted.
   - 358°–002°, -0.5°–+1°, DR4
6. *The Full Monty…..*
   - 250° – +11°, -1° – +1° + extras, DR5

Planned Data Products

1. Level 1: Data cubes of CO line intensity
   - $T_{MB}(l,b,v)$ [K]
     - 1°x2° cubes along the galactic plane
       - stepped by 0.5°, 30"+0.1 km/s, 3 isotopologues
     - 10°x2° cubes, 1 km/s
     - PV plots in longitude
2. Level 2: Column Density
   - $N_{CO}(l,b,v)$ [cm^{-2}]
     - From X-factor to Optical depth + temperature
3. Level 3: Mass
   - $M_{H2}(l,b,z)$ [$M_{\odot}$/pc]
     - Abundance [CO/H_2]
     - Distance [Galactic Rotation Curve or CMZ-specific]

Part 2: An outreach programme for CTA-UK

- UK-N Consortium:
  - Leicester, Oxford, Durham, Liverpool
    - PI Jon Lapington
  - Pre-production phase for the CHEC camera for SSTs
- Outreach Programme
  - Planetarium "Shorts"
    - 1st in production: *Multi-wavelength Milky Way and the CTA*
  - Videos, e.g. Meet the Scientists
  - Social Media
    - Coordinate with CTA

Check out "Unseen Universe" full-dome planetarium show at

Facebook.com/armaghplanet
YouTube.com/armarghplanetarium

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