National Aeronautics and Space Administration
Cosmic Origins Program Office

Request for Information: Science Objectives for the Next UV/Visible Astrophysics Mission

NASA's Cosmic Origins (COR) Program

Community Workshop

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National Aeronautics and Space Administration
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UV/Vis RFI#1: Responses

- Responses:
  - 34 compliant responses
  - Most sent by teams (not individuals)
- Responders:
  - PI Nationality:
    - US: 29 (MD(10), CA(4), AZ(3), CO(2), MA(2), DE, DC, IL, MN, OH, TN, WA, WI (each 1))
    - Non US: 5 (France(2), Canada, Spain, UK (each 1))
  - PI Institution type
    - US Universities: 18
    - STScI: 6
    - NASA Centers: 5
    - Non-US Universities: 3
    - Other: 2

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UV/Vis RFI#1:
All Responders

- Participants: 219 individuals
- US Participants:
  - 21 states:

    MD(46); CA(35); MA(15); CO(11); AZ(10); OH(8); MI(6); DC, IN, NJ(4 each); VA, WI (3 each); GA, IL, NY, PA, TX, WA(2 each); AL, CT, DE, LA, MN, TN(1 each)
  - Variety of institution types:

    Universities(90), STScI(26), NASA Centers(19), Observatories(11); Other(7)
- Non-US Participants:??
  - 11 Countries:

    Canada (16); France (9); UK, Spain(5 each); Italy(4); Denmark(3): Japan, Sweden, Switzerland(2 each); Australia, Germany, Ireland, Netherlands (1each)
  - Institution types:

    Universities(22), National Agencies(6); Research Institutions / Observatories (22)

Science Areas: # Responses

- Primary Science Areas (Simplified, as on website)
  - Stars: 6
  - Nearby Galaxies: 6
  - Intergalactic Medium(IGM) Circumgalactic Medium(CGM): 6
  - Galaxy Evolution: 4
  - Planets / Solar System: 4
  - AGN: 3
  - Multiple Areas: 3

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UV/Vis RFI#1: Rich Diversity of Science

- Exoplanets
  - Planet Formation
  - Planetary system evolution
  - Planetary properties
  - Planetary evolution
  - Solar System
  - Life
- Chemical Evolution
  - Stars
  - Galaxies
- Stellar Evolution
  - Circumstellar gas
  - Stellar structure
  - Mass loss / mass gain
- Interstellar Medium (ISM)
  - ISM Structure
  - ISM Evolution
  - Dust form. & props.
- Star Formation
  - Stellar Populations
  - Process
  - Clustering
  - Galactic Structure
- Galaxy Evolution
  - Galaxy feedback
  - Nearby galaxy properties
  - Galaxy formation
  - Galactic inflows and outflows
- Active Galactic Nuclei (AGN)
  - AGN growth
  - AGN accretion/ outflow / feedback
  - AGN /Black Hole properties
- Circumgalactic Medium (CGM)
- Intergalactic Medium (IGM)
  - Intracluster Medium
  - Cosmic Web
- Cosmology / Fundamental Physics
  - Large Scale Structure
  - Dark Matter
  - Dark Energy

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Science Requirements
Responses needing…

- Angular Resolution:
  - < 0.0001” 2
  - < 0.01” 1
  - 0.02” - 0.5” 5
  - 0.1” - 0.2” 2
  - 1” 1
  - 30” 1

- Field Of View (when specified):
  - < 0.03deg^2 (~10’ x10’) 3
  - 0.3 - 0.1deg^2 (10’ x10’ - 20’ x20’) 8
  - 0.25deg^2 (~30’ x30’) 1
  - 0.5 - 0.7deg^2 (40’ x40’ - 50’ x 50’) 2
  - Not given 21

- Wavelength Coverage:

λ low (Å)		λ high (Å)	
~900	6	1216	1
~1000	4	~3000	3
~1100	3	4000	5
~1200	6	6300	1
~2000	3	~9000	4
		10,000+	3

- Spectral Resolution:
  - 100-1000 4
  - 1000-10,000 5
  - 15,000 – 60,000 7
  - 100,000+ 3

Observational Modes: # Responses needing…

- Spectroscopy / Photometry:
  - Photometry only: 7
  - Spectroscopy only: 13
  - Both: 14
- Spectroscopy Multiplexing:
  - Integral Field Unit (IFU) 2
  - Multi-Object Spectrograph (MOS) 7
  - Slitless Wide-field 1
- Time Domain: 8
- Interferometry: 2
  - Spectra and imaging
- Coronography: 2
  - Exoplanet Studies
- Polarization: 2

Science Requirements: Instrument Concepts

- "Super FUSE"
  - Optimized sensitivity 912Å – 1250Å
  - Spectral resolution requirements vary *widely*, R 6,000-100,000
  - Multiplexing – MOS and IFU both mentioned, however not always required
  - Angular resolution not usually mentioned (one response requests < 0.1")
- "Super GALEX"
  - Wide-Field Imager (but required FOV no more than 0.7deg^2)
  - Angular resolution usually ~0.1" (but some <0.05")
  - Range of λ_{short} (some to 912Å, 1200Å, 1900Å)
  - Range of λ_{long} (some ~3000Å, some to 10,000Å)
- "Super COS"
  - Multiplexing – MOS or IFU
  - Spectral Resolution ~20,000-50,000
  - Angular resolution ~ 1"
  - Wide range of spectral coverage:
    - λ_{short} 912Å, 1200Å, 1900Å
    - λ_{long} ~3000Å, ~4000Å, some to 10,000Å
- Interferometers, Coronographs, Polarization, Widefield Slitless Spectrograph

Science Requirements: Program Needs

- Science Requirements often seem incomplete, as submitted
- Telescope diameter often doesn't seem to be a requirement
  (e.g., for diffraction-limited imaging)
- ***PLEASE*** make sure we have your Science Requirements as in suggested Template:

Your RFI Topic
Science Requirements

- Imaging / Spectroscopy / Time Domain
- Field(s) of View
- Physical / angular resolution(s)
  - Required / Desired
- Spectral resolution(s) (if relevant)
  - Required / Desired
  - Multiple
- Wavelength band(s)
  - Required / Desired
  - Lower limit / Upper limit
- Sensitivity
  - Required / Desired
- Dynamic Range
  - Required / Desired
- Other requirement(s)
  - Required / Desired