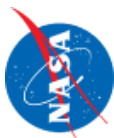


2 Appendix A: Quad Chart



A Fiber-Coupled Plasmonic Spectrometer for In Situ Characterization of Solar System Surfaces

PI: Nancy J. Chanover, New Mexico State University

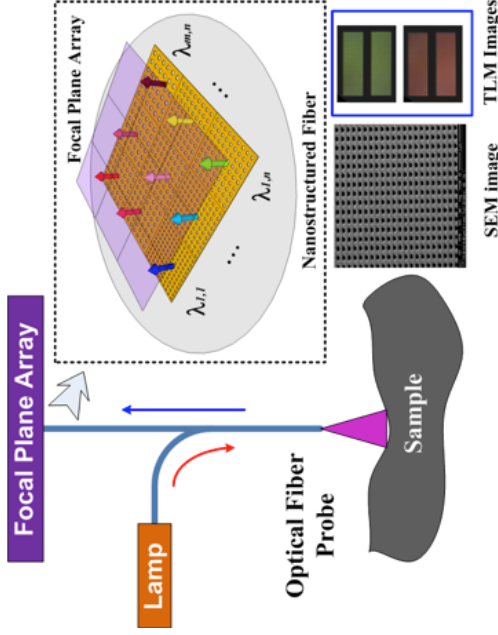
Target: airless body surfaces and subsurfaces

Science:

- Determine form and species of volatiles on/below surface
- Characterize composition & chemistry of ocean as manifested on surface
- Characterize the effects of space weathering in processing surface materials on icy bodies
- Map surface materials for astrobiology investigations, including pre-drilling activities

Objectives:

- **Source Development:** explore various illumination sources
- **Fiber Coupling:** optimize the source illumination and reflectance measurement using optical fiber bundles
- **Plasmonic Filter Development:** optimize the spectral characteristics of periodically coupled nanostructures
- **Prototype Development:** begin development of both optical and NIR instrument prototypes using results from the above studies and conduct end-to-end tests using reference materials of interest



Left: Schematic drawing of the proposed spectrometer. At lower right is an SEM image of a 2D plasmonic resonant grating fabricated by Co-I Cho's group for photon-SPP conversion. Two transmitted-light-microscope (TLM) images of the fabricated nanostructures show wavelength-selective optical transmission.

Key Milestones:

- Year 1: complete source development, plasmonic filter development, and fiber coupling
- Year 2: optical instrument prototype development
- Year 3: infrared instrument prototype development

CoIs: David Voelz and Sang-Yeon Cho/New Mexico State University

TRL 2 to 4

Planetary Instrument Concepts for the Advancement of Solar System Operations (PICASSO)