



DOWSER: Detecting Objects' Water from Spatial Epithermal-neutron Response

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Target: Planetary body orbit and lander

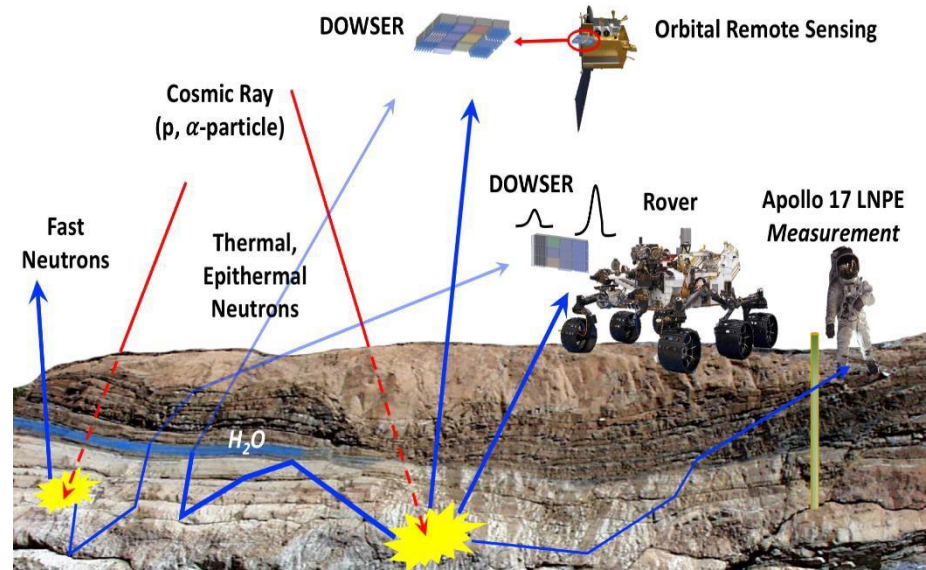
Science:

- Goal: measurement of epithermal neutron flux to sense the presence of water and other hydrogen-rich species within planetary regolith.
- Approach: develop configurable cellular neutron detector array that overcomes limitations of previous instruments, enabling a wide variety of missions with superior spatial and spectral resolution of neutron flux.

Objectives:

- Design and build functional compact neutron detector cells for dosimetry, spectroscopy and spatial resolution.
- Design multi-cell network to exceed performance of previous orbital detectors (LP-NS, LEND).
- Build functional modular array of sealed cells to demonstrate principles of an integrated detector array.
- Demonstrate superior energy and spatial resolution, gamma rejection and detection of planetary subsurface water at NASA GGAO test facility

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DOWSER application to discovery of water in planetary regolith.

Key Milestones:

- Year 1: Design/construct 2x2 cellular array detector
- Year 1: Measure detector energy and spatial resolution, compare with numerical modeling
- Year 2: Design/construct 5x5 array based on 2x2 results
- Year 2: Optimize resolution of 5x5 array
- Year 3: Test 5x5 array at NIST, UMD and GGAO
- Year 3: Compare test results with numerical modeling

TRL 2 to 4