



Dynamic Albedo of Neutrons instrument onboard Mars Science Laboratory

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Successful nuclear experiments GRS, NS and HEND onboard NASA Mars Odyssey have proved the high research power of nuclear methods for Mars exploration. The Mars Odyssey observations revealed huge water-ice regions poleward 60N and 60S latitudes and significant excess of subsurface water in some equatorial regions of Mars. The orbital neutron data from Odyssey corresponds to the surface resolution of few hundreds of kilometers, and one could guess that similar or even larger variations of water content would be detected from a neutron detector onboard surface mobile laboratory on Mars.

This surface experiment with neutron instrumentation will be performed onboard NASA Mars Science Laboratory (MSL), which is scheduled for launch in 2009. This mobile platform will have radio-isotope sources of energy, which produce local radiation background of neutrons and gamma-rays around MSL. Therefore, neutron instrument for characterization of water content in subsurface has to be active one: it should emit short pulses of high energy neutrons and then detect dynamic albedo of neutrons after each of them. Local radiation background could be excluded from variable time profiles of induced neutrons die away curves, and shapes of these curves allows to measure content of water and layering structure of subsurface below wheels of MSL. This is the physical concept of Dynamic Albedo of Neutrons (DAN) experiment, which is contribution of Russian Federal Space Agency to NASA MSL mission