



## Hydrogen concentration in Lunar South Circumpolar Region according to LEND data

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The neutron spectrometer LEND (Lunar Exploration Neutron Detector) [1] continuously operating at lunar orbit on-board the Lunar Reconnaissance Orbiter (LRO) mission [2] since 02 Jul, 2009. The primary goal for this instrument is to test for the presence of hydrogen in regolith of the Moon's Polar Regions with spatial resolution at to  $\sim 10$  km. According to one of hypothesis the Permanently Shadowed Regions (PSRs) in vicinity of poles may contains a large amount of hydrogen (water ice) in regolith. Thus the PSRs were a primary target of the LEND investigation. It was found that only few of them indicated statistically significant evidence of the presence of hydrogen in the regolith. On the other hand, there were several cases where hydrogen was significantly detected in sunlit areas [3, 4]. Layering conditions for hydrogen to be preserved in these areas should be covered by a desiccated (or 'dry') regolith layer.

We are performing a multi-instrument LEND-Diviner-LOLA data analysis to determine the lower limit of hydrogen concentration and minimal depth of its presence. Properties of the regolith are investigated by comparison with the LEND measured neutron suppressions and numerical modeling of neutron flux at LRO orbit. The statistical uncertainty of neutron suppression regions decreases as the observation time of the LEND instrument increases. Thus we use LEND data gathered during four plus years of the LRO mission. Obtained results of this multi-instrument analysis will be presented.

References: [1] Mitrofanov I. G. et al. (2010) *Space Sci. Rev.*, 150(1–4), 183–207. [2] Chin G. et al. (2007) *Space Sci. Rev.*, 129, 391–419. [3] Mitrofanov I. G. et al. (2012) *JGR*, 117, E00H27. [4] Sanin A. B. et al. (2012) *JGR*, 117, E00H26.