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Testing of regolith of celestial bolides with active neutron gamma-ray spectrometry

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Current space instruments for studying planet's surface include gamma ray spectrometers that detect natural radioactive isotopes as well as gamma-rays induced in subsurface by galactic cosmic rays. When measuring from celestial body's surface, statistics and amount of detected elements can be dramatically increased with active methods, where soil exposed to artificial flux of particles. One good example is the Russian Dynamic Albedo of Neutron (DAN) instrument onboard Martian Science Laboratory mission (Curiosity rover) developed in 2005-2011. It is the first active neutron spectrometer flown to another planet as part of a landed mission to investigate subsurface water distribution and which has now successfully operated for more than two years on the Martian surface. Presentation describes a number of space instruments for different landers and rovers being developed in Russian Space Research Institute for studying Moon and Mars, as well as method of active neutron and gamma spectrometry overview.