

## A Mass-Spectroscopic LENA Instrument onboard BepiColombo and Chandrayaan-1

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Low-energy neutral atom (LENA) observations bring us important information on particle environments around planetary objects such as Mercury and the Moon. In this paper, we report on a new development of a LENA instrument for planetary explorations. The instrument is light weight (2 kilograms), capable of energy and mass discrimination with a large sensitivity. The performance of the instrument is investigated by numerical simulations. By using our new computer code, we calculated 3D particle trajectories including ionization, neutralization, surface scattering, and secondary electron release. This enables us to obtain detailed performance characterization of LENA measurements by the instrument. We also made trajectory tracing of photons entering the instrument to acquire photon rejection capability. This LENA instrument has been selected for both the Indian lunar exploration mission Chandrayaan-1 and European-Japanese Mercury exploration mission BepiColombo.