Electrostatics on sunlit hemisphere of the Moon

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The Moon orbiting Earth, depending on its phases, encounters with solar radiation and local plasma – in response to these currents, the exposed lunar surface acquires a finite charge, and subsequently leads to a plasma environment over its surface [1-4]. The plasma around Moon may vary in a wide range of energy and number densities of the constituent particles [3], while the degree of solar illumination may contribute to the generating photoelectrons from the lunar regolith [1-4]. The dynamic balance between the subsequent incident plasma and photoemission fluxes might lead to the formation of photoelectron sheath on sunlit locations of Moon which may support the suspension of the fine dust particles under electrostatic equilibrium [4-5]. However, depending on the topography, location, solar radiation/ plasma exposure and the surface parameters, the lunar surface may hold significant contrast in charging, and it may differ by the orders of magnitude – such disparity in the surface charging may act as a source of the transport of charged fine dust and the local atmospheric charge (ions/ electrons) over the lunar regolith [3]. In this brief presentation, we shall discuss our present understanding of the electrostatic charging processes over the sunlit lunar surface and its implications towards charged particle dynamics and transport.

References:

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