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Electric field instrumentation and modelling for the Asteroid Charge Experiment on the Marco Polo Near Earth Object sample return mission

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Asteroid surfaces are widely thought to become photoelectrically charged, though this charge has never been measured directly. Charging is thought to influence regolith transport, and could also have a direct effect on sampling, as the sampling spacecraft and asteroid surface are likely to be at different potentials. The proposed Asteroid Charge Experiment for Marco Polo comprises two sets of electric field electrodes intended for both remote and in situ sensing of asteroid potential, as well as radiation and energetic electron detectors. This presentation will describe modelling of the electric fields expected at the surface of a typical asteroid, and calculations of the asteroid's potential to constrain the signals expected at the electric field detectors.