



## **Towards determination of the Titan ion mobility spectrum**

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One aim of the Huygens probe was to investigate the electrical properties of Titan's atmosphere, principally through lightning detection and atmospheric conductivity measurements. The existence of lightning on Titan remains possible, and with it the prospect of a global electric circuit on Titan, analogous to Earth's global circuit. A key aspect in planetary global atmospheric electric circuits is the behaviour of atmospheric ions, which form the leakage current between the conductive surface and ionosphere. Several models predict the chemical nature of the charged species present in Titan's lower atmosphere, but their electrical characteristics have not yet been determined. Theory connecting ion mass to electrical mobility for terrestrial ions has been modified for the conditions on Titan, and estimates of the mobility of Titan ion species have been obtained. A method for inverting the voltage data from the relaxation probe on the Huygens PWA instrument to obtain ion mobility spectra is under development. This will be used in combination with the mobility-mass model to determine the Titan ion mobility spectrum and the relative contribution of different ion species.