



Acceleration of charged dust particles by low-frequency electromagnetic waves in our solar system

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There are plenty of observations of the low-frequency electromagnetic waves (e.g. whistlers, electromagnetic ion-cyclotron, dispersive Alfvén waves, etc.) in our solar system. Our objective here is to show that the ponderomotive force of the electron whistlers (electromagnetic ion-cyclotron and dispersive Alfvén waves) acts on the plasma electrons (ions), and creates charge separation. Consequently, there appears a space charge electric field which couples the motions of the electrons and ions with charged dust grains. Since the space charge electric field is driven by the ponderomotive force of the waves, the induced electric force causes differential acceleration of charged dust particles in the magnetized plasma of our solar system. Specific examples for the acceleration rates are presented for typical plasma parameters that are representative of the space and cosmic environments.