Computer Model of the Dust Trajectory Sensor (DTS)

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Abstract. Accurate measurement of the velocity vector of individual dust particles is important to find the source of the cosmic dust and its interaction with the space environment. The Dust Trajectory Sensor (DTS) is an instrument to measure the velocity vector of individual dust grains in space. The operation is based on measuring the pickup charge from the dust by an array of wire electrodes. The wires are arranged in planes with alternating orientation of the wires and each wire is connected to a sensitive electrometer. The Coulomb Software is used for the modeling of DTS and simulating the measured signals from particles passing though the instrument. We have calculated the charge distribution for a small central kernel of DTS and reconstructed the simulated signals utilizing the symmetry of the system base on these data, without Coulomb Software. More corrections are applied when the particles are close to the grounded walls. Experimental data (both low and high speed) have been analyzed, which suggests the DTS has a high resolution in speed and angle.