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Ion cyclotron waves associated with Cassini's engine exhaust products

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About 5 hours after the engine firing that placed Cassini in its orbit about Saturn, a prolonged (90 min.) period of ion cyclotron waves occurred, waves very different than those seen on the inbound leg or on successive orbits. These waves occurred in a broad band from the gyro frequency of singly ionized CO_2 through those of N_2 and CO to H_2O. These are the gases that constitute 98% of the engine exhaust of Cassini. These waves were left-hand polarized, propagating at an oblique angle to the magnetic field. The waves had a noticeable compressional component consistent with their off-angle propagation. We interpret the source of these waves to be ions produced by photoionization of the cloud of engine exhaust released at Saturn Orbit Insertion. These ions are accelerated by the magnetospheric electric field associated with corotation of the magnetospheric plasma. The waves appeared only after the pickup velocity was great enough to provide the free energy needed for wave growth.