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Observation of the electric field of a cold neutral plasma[1] HYUNWOOK PARK, University of Virginia, RAHEEL ALI, Quaid-i-Azam University, THOMAS GALLAGHER, University of Virginia — The electric field of a cold nearly neutral plasma in a Rb magneto-optical trap is investigated by observing the Stark shift of the 42S-42P microwave transition. The plasma field consists of micro- and macro-fields which originate from the nearest ion and the macroscopic charge imbalance, respectively. Although the system is nearly electrically neutral, the microfield is always present. The macrofield arises from the charge imbalance created by the fact that some electrons leave the plasma and the ones which remain have to be on the outside of the plasma. We suggest initial electron distributions at different initial temperatures of the electron from which the charge imbalance, or spatial distribution of the excess ions, can be estimated. The combination of the computed micro- and macro-fields agrees well with the observed data.

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