

Small dust grains could be found in many environments. Because of their size, their charge and the electric forces acting on them play an important role in their dynamics. The dust grain charge is influenced by many different processes. Among other methods, charging processes can be studied by trapping a single dust grain inside an electrodynamic quadrupole where it is put into specific environment (ion or electron beam, UV radiation). The progress of the charging process can be inferred from the changes in the grain charge. Our work contributed to the building of a new laboratory set-up for study of the charging processes. Specifically, a new Faraday cup for measurements and stabilization of the ion and electron gun currents is designed and its function verified. It solves the shortcomings of the previously used Faraday cups. Further, an amplifier for the ion gun current measurement is designed and constructed along with the design of digital stabilization of the current. The stabilization is necessary for the interpretation of measurement results and its digitalization will allow more flexible adjustment and easier connection with the control computer. Finally, data acquired during the charging of dust grain with different ion species are evaluated in order to study the effect of different ions on surface modification. These measurement have shown a need for construction of a new laboratory set-up.