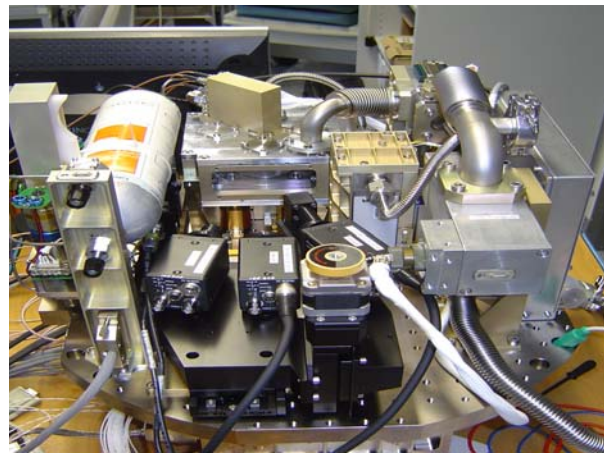
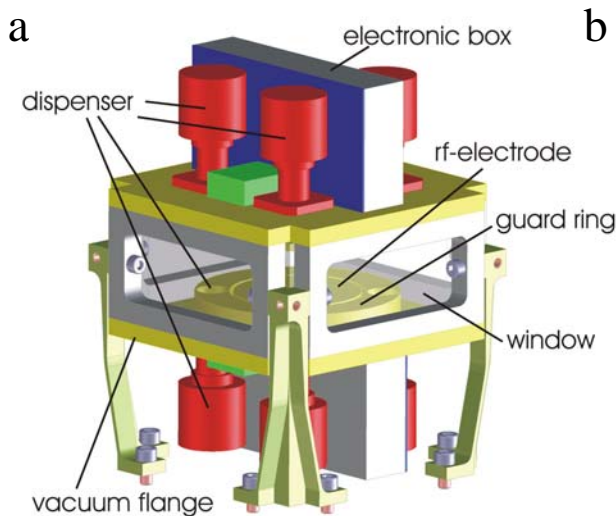




PK-3 Plus is the follow-up experiment of PKE-Nefedov and is planned to be launched in December 2005. It will continue the very successful work on the ISS with a significantly improved hard- and software. The hardware, designed and manufactured at the Institute with the help of space industry, was tested in two parabolic flight campaigns. These first low-gravity experiments delivered first scientific results and showed the advanced possibilities of this new laboratory.

The research of complex plasmas under microgravity conditions is very important for the understanding of this new field of research and it complements the experiments in the laboratory. Gravity introduces the major force under laboratory conditions. Weaker forces are not measurable due to its strength. Therefore long-term experiments under μg conditions are very important. PKE-Nefedov, as the first long-term experiment of this kind of research performed on the ISS, showed insights into the physics of complex plasmas that made interest on more and better experiments. Therefore, PK-3 Plus, as the direct follow-up experiment was designed and built at the Institute. This facility allows much more detailed investigations due to its advanced hard- and software. The major changes were carried out 1) on the design of the plasma chamber (see Fig. 1a) for a better symmetry, homogeneity and reproducibility of experimental runs and 2) on the diagnostics. This allow much deeper investigations of the microgravity behaviour of complex plasmas.



In two parabolic flight campaigns we tested the facility on its μg properties and received the first scientific results. The symmetry and homogeneity of the distribution of the microparticle cloud could only be tested under microgravity conditions and show the expected behaviour. Long experimental runs in the laboratory with additional diagnostics, like mass spectrometer, show the long term stability of the system resulting from the continuous gas flow through the plasma chamber.

The flight hardware is now in the manufacturing phase and will be delivered to Russia middle of next year for the launch to the International Space Station.