Dust particles are grown by sputtering a polymer layer deposited on the electrodes [1]. The plasma is created in a capacitively-coupled rf discharge with a rf power around 3 W under a pressure around 1 mbar. Due to the high density of grown dust particles, many unstable behaviors are noticed like dust particle growth instabilities [2,3,4] and small plasma spheroids with enhanced luminosity appearing in the vicinity of the electrodes [5,6].

In this work, experiments are performed by using a Krypton plasma. To study more finely the instabilities appearing in the discharge, the amplitude of the discharge current (ac and dc components) is recorded and analyzed (see Figure 1(a)). A particular attention is paid on the time evolution of the signal frequency. This analysis indicates the existence of different regimes during the instabilities.

Beside these electrical measurements, observations of the plasma emission are performed by using a high-speed camera. The presence of plasma spheroids in between the electrodes is evidenced. Several types of phenomena are observed like attraction between plasma spheroids, fusion of two spheroids or division of a spheroid in two parts (see Figure 1(b)).

Figure 1: (a) Time evolution of the discharge current (ac component) during dust particle growth. (b) Frames extracted from a video recorded at 16000 frames/sec showing the presence and the motion of a plasma spheroid in the middle of the discharge.