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Externally driven dust density waves at low and high modulation frequencies¹ IRIS PILCH, TORBEN REICHSTEIN, ALEXANDER PIEL, Institute for Experimental and Applied Physics, Christian-Albrechts University, D-24098 Kiel, Germany — An individual dust cloud, confined in an anodic glow discharge, immersed in a radio-frequency-produced plasma, is shown to support self-excited dust density waves (20-30 Hz), if the number of dust grains is sufficiently large. When the anode voltage is modulated at low frequencies (1-15 Hz) the self-excited wave is disturbed by a sloshing and stretching motion of the entire dust cloud. For higher frequencies (16-60 Hz), the self-excited wave is entrained at the external modulation frequency but a spatial wave decay can be found for frequencies above the eigenfrequency of the self-excited wave. If the frequency is further increased, the wave is not anymore entrained at the modulation frequency but the wave propagation is more coherent compared with the self-excited wave. We report on these dynamical features of externally modulated dust density waves.

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Iris Pilch
Institute for Experimental and Applied Physics,
Christian-Albrechts University, D-24098 Kiel, Germany

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