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Effects of dust on the optical emission and electrical properties in a dusty plasma experiment VICTOR LAND, Center for Astrophysics, Space Physics and Engineering Research, Baylor University, Waco, TX, 76798-7310, USA, AUTUMN PARO, ERIN MIDDLEMAS, JORGE CARMONA REYES, ANGELA DOUGLASS, LORIN MATTHEWS, TRUELL HYDE — Dust particles in plasma obtain a charge due to the continuous absorption of free electrons and ions from the surroundings. Depending on the dust size and number density, this can significantly alter the local plasma, as well as the global discharge characteristics. Here, we present measurements of the changes in optical emission originating from argon plasma, as well as changes in the electrical properties of the discharge, as a different number of dust particles is introduced into the plasma, with different sizes. Measurement of the electronic signals of the discharge, including the electrode potential, current and derivative signals, allows determination of the complex impedance and with that, determination of changes in the equivalent circuit of the discharge. Optical emission, on the other hand, is a tracer of energetic electrons, since in argon emission is mostly due to relaxation of energetic atomic states resulting from electron-impact excitation. The experimental results are compared with numerical results from a two-dimensional dusty plasma fluid model. We aim to reproduce the size and density dependent equivalent circuit of the suspended dust clouds.

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