Abstract Submitted
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Filamentation of a Magnetized, Radio Frequency Discharge[1] UWE KONOPKA, BRIAN LYNCH, Auburn University, 206 Allison Laboratory, Al 36849-5311, USA, PINTU BANDYOPADHYAY, DEVENDRA SHARMA, Institute for Plasma Research, Bhat, Gandhinagar-382428, India , EDWARD THOMAS, Auburn University, 206 Allison Laboratory, Al 36849-5311, USA — A filamentation instability has been observed in a radio-frequency (rf) discharge that was subject to an externally applied, homogeneous magnetic field. The instability arises in a uniform rf-discharge after the magnetic field strength is sufficiently increased. First, the plasma shows target-like glow structures, followed by spiral structures at higher fields. Finally, the plasma breaks up into individual, string-like, magnetic field aligned filaments that seem to repel each other. A variety of filamentation states can be observed, but their overall shapes follow the aforementioned rule of magnetic field strength dependency. The detailed picture of the discharge glow, however, depends on experiment specific conditions as the geometric shape and type of the discharge electrodes, the discharge pressure and power. In an effort to verify that the observed effect is universal, we compare experimental measurements made using two different high magnetic field, dusty plasma experiment facilities: the experiment that was located at the Max Planck Institute in Garching, Germany and the newly built MDPX (magnetized dusty plasma experiment) at Auburn University, Alabama. In both experimental setups we could observe filamentation.

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Uwe Konopka
Auburn University, 206 Allison Laboratory, Al 36849-5311, USA

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