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Effect of mass and charge of ionic species on spatio-temporal evolution of transient electric field in CCP discharges SARVESHWAR SHARMA, SANJAY KUMAR MISHRA, PREDHIMAN KAW, Institute for Plasma Research, Bhat, Gandhinagar, Gujarat, India, MILES TURNER, Dublin City University, Galsnevin, Dublin 9, Ireland, SHANTANU KUMAR KARKARI, Institute for Plasma Research, Bhat, Gandhinagar, Gujarat, India — The formation of capacitive sheath and existence of the transition electric field between sheath edge and bulk plasma in RF-CCP discharge is predicted by Kaganovich (PRL 89, 265006 2002); such structures are sensitive to the plasma composition. On the basis of semi-infinite particle-in-cell (PIC) simulation the effect of charge and mass of ionic species on the spatio-temporal evolution of the transient electric field and phase mixing phenomena in linear and weakly nonlinear regime has been explored. As an important feature, the simulation results predict that the maximum amplitude of the transient electric field decreases while the potential structure approaching to the electrode with increasing ionic mass and charge. The excitation of wave like structures in the transition region and efficient energy transport to the bulk region of CCP discharges in a nonlinear regime has also been predicted.

[1] I. D. Kaganovich, Phys. Rev. Lett. 89, 265006 (2002).

[2] I. D. Kaganovich, O. V. Polomarov and C. E. Theodosiou, IEEE Trans. Plasma Sci. 34, 696 (2006).

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