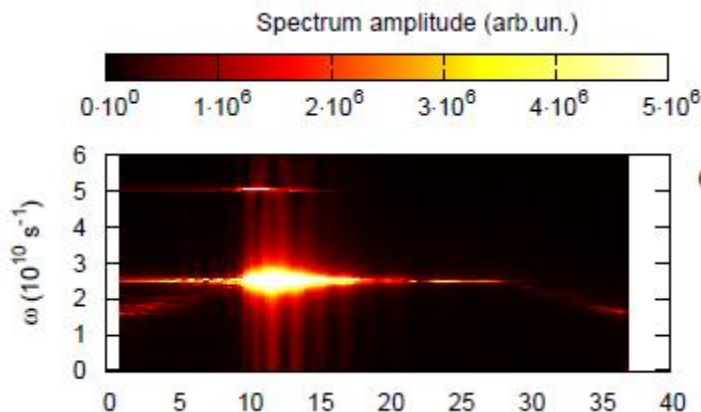


# Riding an electron wave into the future of microchip

Plasma's ability to reproduce fine patterns on silicon has made plasma sources ubiquitous in microchip manufacturing.

A groundbreaking fabrication technique, based on what is called a DC-augmented capacitively coupled plasma source, affords chip makers unprecedented control of the plasma. In this process DC-electrode borne electron beam reaches and hardens the surface of the mask that is used for printing the microchip circuits.

A computer simulations by D. Sydorenko, A. Khrabrov and I. Kaganovich reveal that the beam generates intense plasma waves that move through the plasma like ripples in water and strongly affect plasma. Insights from both numerical simulations and experiments related to beam-plasma instabilities thus portend the development of new plasma sources and the increasingly advanced chips that they fabricate.



(a) Image of a plasma wave spectrum in a DC-augmented capacitively coupled plasma source.