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TH/P6-24: PIC Simulations of the Ion Flow Induced by Radio Frequency Waves in Ion Cyclotron Frequency Range

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PIC simulations have been conducted to study the nonlinear interactions of plasmas and radio frequency wave in the ion cyclotron frequency range. It is found that in the presence of the mode conversion from an electromagnetic wave into an electrostatic wave (ion Bernstein wave), the ions near the lower hybrid resonance can be heated by nonlinear Landau damping via the parametric decay. As a result, the ion velocity distribution in the poloidal direction becomes asymmetric near the lower hybrid resonance and an ion poloidal flow is thus produced. The flow directions are opposite on both sides of the lower hybrid resonance. The poloidal flow is mainly produced by the nonlinear Reynolds stress and the electromagnetic force of the incident wave in the radial direction rather than poloidal direction predicted by the existing theories.

Country or International Organization of Primary Author

China

Collaboration (if applicable, e.g., International Tokamak Physics Activities)

Development of vorpal code

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