

## **Simulations of EBW heating in WEGA\***

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Discharges in the WEGA stellarator are sustained exclusively by 2.45 GHz RF heating. Plasma density is typically far above the critical density so only electron Bernstein waves (EBWs) can propagate inside the plasma. Experiments show dependence on the magnetic field magnitude testifying a resonant principle of the wave damping. The best performance (the most central power deposition) is usually achieved with 0.65 times the resonant magnetic field  $B_{ce} = 0.0875$  T. Typical electron temperatures in WEGA are  $\sim 10$  eV.

EBWs behavior has been simulated with O-X-B conversion efficiency and ray-tracing calculations. Detailed analysis is made difficult because the upper hybrid resonance is far outside the last closed flux surface, where the plasma profiles are fluctuating and the magnetic field is ergodic; therefore, an averaged and extrapolated configuration is used in the calculations. However, possible mechanisms are clearly seen from the simulations results. Growth of the parallel wave number up to  $\sim 30$  along with the characteristic admixture of energetic electrons produced by the RF heating allow strong resonant absorption at the Doppler shifted electron cyclotron resonance so that the deposition region moves towards the plasma center when the magnetic field is decreasing from  $0.85B_{ce}$  to  $0.65B_{ce}$ .

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