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The observed and simulated saturation characteristics of whistler-mode chorus waves[1] XIN AN, CHAO YUE, JACOB BORTNIK, VIKTOR DECYK, WEN LI, RICHARD THORNE, University of California, Los Angeles — The evolution of the whistler anisotropy instability relevant to whistler-mode chorus waves in the Earth's inner magnetosphere is studied using kinetic simulations and is compared with satellite observations. The electron distribution is constrained by the whistler anisotropy instability to a marginal stability state and presents an upper bound of electron anisotropy, which agrees remarkably well with satellite observations. The electron beta $\beta_{\|e}$ separates whistler waves into two groups: (i) quasi-parallel whistler waves for $\beta_{\|e}0.02$ and (ii) oblique whistler waves close to the resonance cone for $\beta_{\|e}0.02$. Landau damping is important in the saturation and relaxation stage of the oblique whistler wave growth. The magnetic amplitude of whistler waves roughly scales with the electron beta $\beta_{\|e}$, shown in both simulations and satellite observations. These results suggest the critical role of electron beta $\beta_{\|e}$ in determining the whistler wave properties in the inner magnetosphere.

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