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Global Gyrokinetic Particle Simulation of Isotope Effects[1] W.W. LEE, S. ETHIER, W.X. WANG, Princeton Plasma Physics Laboratory, Princeton, NJ 08540 — A series of global gyrokinetic particle simulations of ion temperature gradient (ITG) drift instabilities has been carried out using different hydrogen species (H+, D+ and T+) to study the isotope effects. These simulations with adiabatic electron approximations using the GTC code [1] have included the velocity-space nonlinearity for the ions. The inclusion of this nonlinearity in the earlier ITG simulations has impacted the resulting zonal flow and ion thermal diffusivity [2]. Most all all, with the addition of the new nonlinear channels, these simulations have shown to achieve the steady state at a much faster rate and maintain it for a long duration. Initial results based on the inclusion of this nonlinearity in a relatively large a/rho device have indicated that isotope effects are not as evident as those reported earlier [3]. Details will be reported.

[1] Z. Lin, T. S. Hahm, W. W. Lee, W. M. Tang, and R. B. White SCIENCE 281 (5384), 1835 (1998).
[2] W. W. Lee, "Steady State Global Simulations of Microturbulence," Bull. Am. Phys. Soc. 49 (8), 135 (2004).
[3] W. W. Lee and R. A. Santoro, Phys. Plasmas 4 (1), 169 (1997).

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