**Isomak**[1] PETER J. CATTO, MIT Plasma Science and Fusion Center,
R.D. HAZELTINE, University of Texas — An isothermal tokamak, Isomak, is investigated to demonstrate that nearly exact, rigidly toroidally rotating Maxwellian solutions exist for both the ions and the electrons. For the ions this Maxwellian solution is valid in the limit in which unlike collisions of the ions with the electrons are weak and the induced electric field unimportant, while for Maxwellian electrons unlike collisions can be retained as long as the friction with the ions is small (electron-ion collision frequency times the electron gyroradius much smaller than the electron transit frequency times the characteristic scale length). In such cases magnetically confined, exponentially decaying density profiles are allowed, minimizing contact with the wall or limiter. Indeed, the near Maxwellian behavior assures that radial particle and heat fluxes are small. In fact, for specially tailored ion and electron current drives it is possible to maintain the Maxwellians as exact steady state solutions of the full ion and electron kinetic equations. The three reasons to consider an Isomak are its usefulness as an ideal tokamak reference, its possible relevance to Lithium-walled tokamaks, and its value in checking codes in the isothermal limit.

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