Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Linearized Model Collision Operators for Multiple Ion Species Plasmas HIDEO SUGAMA, TOMOHIKO WATANABE, MASANORI NUNAMI, National Institute for Fusion Science — Linearized model collision operators for multiple ion species plasmas are presented, which conserve paricles, momentum, and enery, and satisfy adjointness relations and Boltzmann's H-theorem even for collisions between different particle species with unequal temperatures. The model collision operators are also written in the gyrophase-averaged form that can be applied to the gyrokinetic equation. Balance equations for the turbulent entropy density, the energy of electromagnetic fluctuations, the turbulent transport fluxes of particle and heat, and the collisional dissipation are derived from the gyrokinetic equation including the collision term and the Maxwell equations. It is shown that, in the steady turbulence, part of the heat generated by the turbulent transport fluxes produced in the unstable nonzonal-mode region is nonlinearly transferred into the stable zonal-mode region where the collisional dissipation occurs.

Hideo Sugama
National Institute for Fusion Science

Date submitted: 16 Jul 2009 Electronic form version 1.4