Abstract Submitted
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An assessment of fluid closures based on gyrokinetic and hybrid simulations AKIHIRO ISHIZAWA, National Institute for Fusion Science, SHINYA MAEYAMA, Japan Atomic Energy Agency, TOMO-HIKO WATANABE, HIDEO SUGAMA, NORIYOSHI NAKAJIMA, National Institute for Fusion Science — Fluid closures are investigated by means of the gyrokinetic model and a hybrid model consisting of the gyrokinetic equation for ions and fluid equations for electrons [1]. Effects of closure on the linear growth rate of kinetic ballooning modes (KBMs) are examined by increasing the number of fields from two-fields including density and parallel velocity to six-fields including parallel and perpendicular temperatures and heat fluxes in addition to the two-fields. The Landau closure [2] is good enough to evaluate the linear growth rate of KBM, on the other hand, the model should be modified to get a steady state in nonlinear evolution because of the conservation of quadratic quantity. The importance of ion current in the Ampere's law is also presented. It was expected that the contribution of ion current is much smaller than that of electron current because of large mass ratio, however it is found that the ion current is important for evaluating the growth rate of KBM.

[1] A. Ishizawa, et.al., Nuclear Fusion 53, 053007 (2013).
[2] M. Beer and G. Hammett, Phys. Plasmas, 4046 (1996)

Akihiro Ishizawa
National Institute for Fusion Science

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