Influence of zonal vorticity on the cross phase CHAN-YONG AN,
BYUNGHOON MIN, CHANG-BAE KIM, Soongsil University — The study of the
evolution of the cross phase δ between the electron pressure and the potential in the
resistive-drift-Afvén turbulence under the sheared magnetic field lines are reported.
The linear cross phase is established by both the drift-wave dynamics and the Ohm's
law and it is vanishingly small in the modes with low $k_\parallel$. The nonlinearly saturated
cross phase is correspondingly different from the linear δ mainly due to the $E \times B$
flux. Numerical computations are performed in order to investigate the roles of
$E \times B$ nonlinearity when the self-consistent zonal flow exists on δ by using BOUT++
platform. In this work, the influence of the non-uniformity of the zonal flow, the
gradient and the curvature, on δ and transport is presented and the departure of δ
from the linear state is particularly highlighted.

Chan-Yong An
Soongsil University

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