

Abstract Submitted  
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**Gyrokinetic theory of auroral arc formation and electron acceleration in the magnetosphere-ionosphere coupling**<sup>1</sup> TOMO-HIKO WATANABE, Department of Physics, Nagoya University — We have constructed a unified theoretical model of auroral arc growth and electron acceleration by means of the gyrokinetic and two-fluid equations for the magnetosphere-ionosphere (M-I) coupling system. The new theory describes destabilization of kinetic (or dispersive) Alfvén waves (KAWs) in the M-I coupling, where development of upward and downward field aligned currents carried by the KAWs leads to ionospheric density enhancement and depletion, respectively. The feedback M-I coupling through KAWs elucidates growth of auroral arcs, excitation of KAWs, and field-aligned acceleration of electrons self-consistently. The unified theoretical model of M-I coupling provides a possible explanation to the Alfvénic auroras observed by the FAST spacecraft, and is also appreciated as a successful application of gyrokinetics to auroral physics.

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Tomo-Hiko Watanabe  
Department of Physics, Nagoya University

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