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Heat and momentum transfer for magnetoconvection in a vertical external magnetic field[1] TILL ZÜRNER, WENJUN LIU, DMITRY KRASNOV, JÖRG SCHUMACHER, Technische Universität Ilmenau — The scaling theory of Grossmann and Lohse (J. Fluid Mech. **407**, 27 (2000)) for the turbulent heat and momentum transfer is extended to the magnetoconvection case in the presence of a (strong) vertical magnetic field. The comparison with existing laboratory experiments and direct numerical simulations in the quasistatic limit allows to restrict the parameter space to very low Prandtl and magnetic Prandtl numbers and thus to reduce the number of unknown parameters in the model. Also included is the Chandrasekhar limit for which the outer magnetic induction field **B** is large enough such that convective motion is suppressed and heat is transported by diffusion. Our theory identifies four distinct regimes of magnetoconvection which are distinguished by the strength of the outer magnetic field and the level of turbulence in the flow, respectively.

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