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The importance of ion-electron collisions and temperature evolution in ion transport[1] JEONG-YOUNG JI, E.D. HELD, Utah State University — Ion-electron collisions have been ignored by the small mass- ratio approximation in studies of ion transport processes, including Braginskii's closure theory. However, recent analytical calculations[2] show that the ion-electron collision terms must be retained whenever the ion temperature is comparable to or higher than the electron temperature. For equal electron and ion temperatures, the ion transport coefficients are moderately modified by the ion-electron collision operator. When the ion temperature is higher than the electron temperature, temperature change terms in the moment equations must also be kept. The ion coefficient formulas from 3 moment (Laguerre polynomial) calculations, precise to less than 0.4% error from the convergent values, are discussed for the relevant case that includes both the ion-electron collision and temperature change terms.

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[2]J.-Y. Ji and E. D. Held, Phys. Plasmas **13**, 102103 (2006); **15**, 102101 (2008)

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