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Effects of gyrocenter shift on the retrograde motion of cathode spots and plasma transports K.C. LEE, University of California Davis — The gyrocenter shift phenomenon explained the mechanism of radial electric field formation at the boundary of fusion devices [K. C. Lee, *Phys. Plasmas* **13**, 062505 (2006)]. The theory of gyrocenter shift is also applicable to low temperature high collisional plasmas by the generalization of the theory resulting from short mean free path comparing to gyroradius. Introducing the expanded formula of gyrocenter shift, the retrograde motion of cathode spots in the arc discharge is investigated through a model with similar parameters to an experimental study. It is found that a reversed electric field is formed in front of cathode spots when they are under magnetic field parallel to the cathode surface and this reversed electric field generates the rotation of cathode spots opposite to Amperian direction of the whole discharge. The ion drift velocity profiles calculated from the model are in agreement to the experimental results as functions of magnetic flux density and gas pressure. Also, the effect of the gyrocenter shift on the plasma transport will be discussed.

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