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Exploring the accuracy and reliability of plasma fluid models for direct current glow discharges[1] THOMAS UNDERWOOD[2], University of Florida, IGOR KAGANOVICH, ALEXANDER KHRABROV, Princeton Plasma Physics Laboratory — Glow discharges are of fundamental importance to a variety of industrial applications such as plasma processing, discharge lighting and plasma chemistry. Therefore, a detailed understanding of the physical phenomena that occur within glow discharges is necessary for further advances in design and optimization of relevant plasma applications. Of the various plasma modeling approaches, most use either a fluid approximation, kinetic (particle) approach, or a hybrid model. Although each method has its own set of unique advantages, recent advances in hybrid techniques have shown unique promise to maintain computational efficiency and accuracy. The validity of assumptions within the fluid and hybrid models will be established by direct comparison with results obtained in an electrostatic direct implicit particle-in-cell code (EDIPIC). The accuracy of these assumptions will also be explored within each region of a typical glow discharge and relevant theory will be discussed to explain these results.

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