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Zilong Song*, Department of Mathematics and Statistics, York University, 4700 Keele street, Toronto, ON , Canada, **Xiulei Cao**, Department of Mathematics and Statistics, York University, 4700 Keele street, Toronto, ON , Canada, and **Huaxiong Huang**, Department of Mathematics and Statistics, York University, 4700 Keele street, Toronto, ON , Canada. *On connection conditions through boundary layer of Poisson-Nernst-Planck system.*

We consider the dynamic Poisson-Nernst-Planck (PNP) system, with assumptions of local electro-neutrality (LEN) and near global electro-neutrality (GLN), i.e., without $O(1)$ extra charge. There is boundary layer near domain boundary, which requires more computational efforts to resolve. A natural question is that, can we replace the boundary layer by some effective boundary/connection conditions and solve the bulk region directly? In this talk, we present connection conditions for various boundary conditions, including Dirichlet and flux conditions for ion concentration and Dirichlet and Robin conditions for electric potential. Some numerical examples will be discussed to verify the connection formula. Also, we investigate a PNP system combined with Hodgkin-Huxley model, which has important applications in neural cells. (Received September 22, 2017)