1011-37-393   **Weishi Liu*** (`wliu@math.ku.edu`), University of Kansas, Department of Mathematics, 1460 Jayhawk Blvd. Rm 405, Lawrence, KS 66045-7523, and **Bixiang Wang** (`bwang@nmt.edu`). *Poisson-Nernst-Planck systems for narrow tubular-like membrane channels.*

The talk is concerned with global dynamics of the Poisson-Nernst-Planck (PNP) system for flows of two types of ions through a narrow tubular-like membrane channel. As the radius of the cross-section of the three-dimensional tubular-like membrane channel approaches zero, a one-dimensional limiting PNP system is derived. This one-dimensional limiting system differs from previous studied one-dimensional PNP systems in that it encodes the defining geometry of the three-dimensional membrane channel. We justify partially this limiting process by showing the upper-semi-continuity of the attractors of the three-dimensional PNP system to that of the limiting PNP system. For large Debye number, the steady-state of the one-dimensional limiting PNP system is analyzed using the geometric singular perturbation theory. (Received August 31, 2005)