

1032-35-38

**Rolf Josef Ryham\*** (ryham@rice.edu), Dept. of Mathematics, Rice University - MS 136,  
Houston, TX 77006. *Solving Diffuse Charge Equations*. Preliminary report.

The speaker will present recent work on the existence of strong solutions to the Nernst-Planck-Poisson equations, a coupled system of nonlinear, nonlocal evolution PDE related to the dynamics of diffuse charges. Natural boundary conditions prevent an approach to proving existence by Galerkin methods. The speaker will show how a change of variables overcomes this difficulty and the analysis leading to an existence result. (Received July 25, 2007)