

1069-65-47

**Dexuan Xie\*** ([dxie@uwm.edu](mailto:dxie@uwm.edu)), Department of Mathematical Science, University of Wisconsin-Milwaukee, Milwaukee, WI 53201. *Fast finite element solver development for a nonlocal dielectric continuum model.*

The nonlocal continuum dielectric model is an important extension of the classical Poisson dielectric model but much more expensive to be solved numerically. In this talk, I will first introduce one commonly-used nonlocal dielectric model and demonstrate its great promise in the calculation of free energies with a much higher accuracy than the Poisson model. I then will report some recent results we made on the finite element analysis and fast solver development for this model. Remarkably, we split the solution of this model as a sum of the two functions that satisfy one Helmholtz equation and one Poisson equation, respectively. This makes it possible to develop fast solvers for nonlocal dielectric modeling. This project is supported in part by NSF grant #DMS-0921004. (Received December 21, 2010)