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**Monte-Carlo Study of Binding Kinetics in Surface Plasmon Resonance Systems** MATTHEW RAUM, UWE TÄUBER, Virginia Tech, Department of Physics, KIMBERLY FORSTEN-WILLIAMS, Virginia Tech, Department of Chemical Engineering — Surface plasmon resonance (SPR) has become a standard tool for studying ligand-receptor binding reactions in real-time. Ideally the data obtained with this technique allows measurement of kinetic reaction rates (rather than merely the equilibrium constant for the reaction). In typical experimental configurations one species is immobilized near the active surface while its binding partner is initially suspended in solution, flowing across the active surface. It is generally appreciated that reaction rates observed in SPR experiments are affected by mass transport if the time scales for reaction and transport in the system are comparable. The issue of ensuing effective reaction rates has been treated through different approaches in the literature. The goal of this research is a quantitative study of how faithfully intrinsic binding rates can be measured in SPR devices. We employ a lattice Monte Carlo method to simulate SPR experiments in order to test the efficacy of common SPR analytical techniques. We point out where existing analytical techniques succeed or fail in measuring binding and dissociation rates, and investigate the influence of secondary parameters in the system (such as the flow rate) on experimental data.

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