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Surfaced-Enhanced Raman Scattering of λ-DNA[1] DIANE ALVAREZ, JIANDI ZHANG, Louisiana State University, Baton Rouge, LA 70803, HONG WEI, HONGXING XU, Institute of Physics, CAS, Beijing, 100080, China
— The ability to engineer metal particles at the nanoscale in which plasmons can be excited, directed, and manipulated has led to the rapid development of the field of "plasmonics". Here we demonstrate that the Raman scattering of λ-DNA molecules with colloidal silver nanoparticles is drastically enhanced by surface plasmon excitations. Colloidal silver nanoparticles ($\sim$ 90 nm size) were assembled onto DNA molecules using the molecular combing method. Surface-enhanced Raman scattering (SERS) spectra were obtained and compared for different solution concentrations of the DNA/Ag system. It is evident that the SERS peaks were shifted to a lower or higher wavenumber, depending on the concentration of the solution. These different shifts of Raman frequencies may indicate that the different stretching states of DNA molecules in different concentrations probably influence the Raman frequencies. It is speculated that the coiling states of DNA molecules might be different in different concentrations, thus making it a promising method for the study of DNA functionalities and DNA-nanoparticle interactions.

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Diane Alvarez
Department of Physics, Louisiana State University, Baton Rouge, LA 70803

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