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**Suppression of quenching in metal nanoparticle based spasers**[1] L. S. PETROSYAN, T. V. SHAHBAZYAN, Jackson State University — Radiation of a dipole in a close proximity to the metal surface is quenched due to nonradiative energy transfer to optically inactive excitations in metal. We show that in spaser action, involving ensemble of pumped two-level systems interacting with a resonant plasmon mode in a metal nanoparticle, quenching is suppressed. We develop a model that incorporates coupling of gain molecules to nonresonant nanoparticle modes, which are responsible for quenching of plasmon-enhanced fluorescence, and show the effect of quenching on spaser threshold is reduced for larger gain densities. We derive explicit condition relating gain molecule ensemble size and their average proximity to the metal surface which governs the importance of quenching effects in metal nanoparticle based spasers.

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