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Sensitivity of Ag:DNA fluorescence to single base mutations of hairpin strands[1] ELISABETH GWINN, RAMEEN HASSANZADEH, PATRICK O'NEILL, DEBORAH FYGENSON, Physics Department, UCSB — DNA strands can stabilize fluorescent silver clusters composed of just a few atoms [1]. The small size of these photon emitters and their formation in single-stranded DNA [2] give Ag:DNA emitters promise for use in optically-active, self-assembled DNA nanostructures. Exploiting this promise requires an understanding of how fluorophore color relates to the sequence and conformation of the host DNA strand. Here we examine the optical properties of Ag:DNA solutions for a family of DNA hairpins that differ by single base mutations in the hairpin loop. Specific mutations result in spectral redistribution of the fluorescence and large changes in brightness, pointing to geometric control as a means to select specific emitter species.

[1] J.T. Petty, J. Zheng, N.V. Hud and R.M. Dickson, "DNA-templated Ag nanocluster formation," J. Am. Chem. Soc, 126, 5207 (2004).
[2] E.G. Gwinn, P. O'Neill, A. Guerrero, D. Bouwmeester and D.K. Fygenson, "Sequence-dependent fluorescence from DNA-hosted silver nanoclusters," Advanced Materials 20, 279 (2008).

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