Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Fluorescent Dendrimer Nanoconjugates as Advanced Probes for Biological Imaging DANIEL REILLY, SUNG HOON KIM, JOHN A. KATZENELLENBOGEN, CHARLES M. SCHROEDER, Univ of Illinois - Urbana — Recent advances in fluorescence microscopy have enabled improvements in spatial resolution for biological imaging. However, there is a strong need for development of advanced fluorescent probes to enable a molecular-scale understanding of biological events. In this work, we report the development of a new class of probes for fluorescence imaging based on dye-conjugated dendrimer nanoconjugates. We utilize molecular-scale dendritic scaffolds as fluorescent probes, thereby enabling conjugation of multiple dyes and linkers to the scaffold periphery. In particular, we use polyamidoamine dendrimers as molecular scaffolds, wherein dye conjugation can be varied over a wide range. Single molecule fluorescence imaging shows that dendrimer nanoconjugates are far brighter than single fluorophores, resulting in increased localization precision. In addition, we further developed a new set of remarkably photostable probes by conjugating photoprotective triplet state quenchers directly onto the dendritic scaffold. We observe large increases in the photobleaching times compared to single dyes and reduced transient dark states (blinking). Overall, we believe that these new probes will allow for single molecule imaging over long time scales, enabling new vistas in biological imaging.

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Date submitted: 13 Nov 2013 Electronic form version 1.4