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Wide field fluorescence microscopy of single nanoparticles

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Single molecule fluorescence microscopy is a well known imaging technique used to image single probes in their nano environment. Optical studies of individual probes provide rare photo physical and photo chemical processes that are hidden in the ensemble average [1]. Fluorescence microscopy images are a source of information about the structure and the spatial distribution of a molecule of interest. The technique that was used for this research was wide field fluorescence microscopy. Using this technique requires that the whole sample be illuminated evenly by the source light as well as imaging the entire illuminated area [2]. In our work fluorescent signatures from single nanoparticles coated with rhodamine dye molecules were captured using a CMOS camera and was analyzed using an image processing software. To ensure that individual nanoparticles are imaged the sample solution concentration must be in the nano molar range, ensuring that the nanoparticles are sparsely spread over a glass cover slide. The image analysis also showed useful information on photo bleaching, photo stability and localization accuracy of the single nanoparticles.

[1] R. M. Dickson et al, "On/Off blinking and switching behaviour of single molecules of green fluorescent protein," Letters to Nature, vol. 388, pp. 355-358, 1997.

[2] F. Rost, Fluorescence microscopy volume 1, New York: Cambridge University Press, Cambridge & New York, 1995.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

Msc

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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