One-photon excited luminescence of single gold particles diffusing in solution under pulsed illumination

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Résumé en anglais	Here we report on the visible luminescence of single gold nanospherical particles diffusing in water excited by a pulsed-laser at 488 nm. The signal studied by fluorescence correlation spectroscopy does not display the expected characteristics. The main deviation is obtained for the diffusion time that depends on the laser irradiance. Additional advanced methods of measurements have been implemented to further characterize the emission. These methods have allowed us to demonstrate that the luminescence does not blink even in the picosecond domain and that it does not photobleach either. The comparison between the signals obtained under pulsed and continuous excitations at the same wavelength suggests that the increase in the particle temperature plays a role in the non-linear increase in the luminescence intensity with the excitation power. As in the case of two-photon excited luminescence, it implies that a model describing the luminescence process for a single particle diffusing in liquid must take into account the whole system composed of the gold particle, the capping ligands and the surrounding water.
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