



Deterministic Laser Writing and Laser Annealing of Colour Centres in Diamond

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Ultrafast laser processing was shown recently to facilitate the generation of NV centres in diamond with spin coherence (300K) approaching 1 ms, a yield of about 40% and a positioning accuracy of better than one micrometre [1]. Here we report an adapted method for laser writing of individual colour centres which involves local laser annealing combined with feedback via a fluorescence monitor [2]. This method provides both improved positioning accuracy and near-unity yield for NV generation.

We used a monocrystalline diamond sample with $[N_s] \sim 2$ ppm. Vacancies were generated with a single pulse from a 790 nm Ti:Sapphire laser. Local annealing was achieved with a 1 kHz stream of lower energy pulses. A fluorescence monitor allowed observation of the creation of NV centres in real time during annealing, such that deterministic writing was achieved by terminating



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Brain oscillations track the formation of episodic memories in the real world
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[20th International Conference on Materials Science and Engineering, October 21-22, 2020](#)

8. Abstract Citation : [20th International Conference on Materials Science and Engineering, October 21-22, 2020](#) [A low-voltage low-power positive feedback operational amplifier using Carbon Nanotube Field Effect Transistor.](#)



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