

In this work, we focus on the interaction of SiV color centers in diamond with femtosecond light pulses. In the theoretical part, a script is developed to simulate the experimental varying stripe length method and the effects of saturated optical gain are investigated. In the experimental part, photoluminescence and transient differential absorption under non-resonant excitation are studied. The result of the luminescence measurements are estimates of the effective cross-sections of single-photon absorption for the wavelengths 620 nm, 515 nm and 340 nm, as well as the effective cross-section of three-photon absorption for 2000 nm. The result of the differential absorption measurements is the relaxation constant of the excited level of the SiV center and the upper estimate of the time duration of the initial dynamics.