Study of photophysical characteristics of H3 centers in diamond

Pomazkin D. A.[1,@], **Danilov P. A.**[1], **Vins V. G.**[1], **Skorikov M. L.**[1], **Vyatkin S. V.**[2] **and Kudryashov S. I.**[1]

[1] Lebedev Physical Institute of the Russian Academy of Sciences, Leninsky Avenue 53, Moscow, 119991, Russia

[2] Lomonosov Moscow State University, Leninskiye Gory 1, Moscow, 119991, Russia

[@] dpomazkin@lebedev.ru

Diamond color centers are in high demand in emerging photonic technologies such as quantum computing, single-photon sources, and magnetic field sensors. H3 centers are of great interest as an active medium for laser generation in the 500-600 nm range [1] [2]. Implementing such technologies requires precise measurements of the photophysical characteristics of the centers, which are currently known from outdated measurements from the 1980s [3].

In this study, the emission cross section was measured using two methods. The first method is based on studying the photoluminescence yield under pumping with ultrashort 150-fs laser pulses of variable intensity. The second method determines the emission cross section based on the luminescence decay kinetics. The values obtained using these methods, 2.7×10^{15} cm^2 and 2.0×10^{-15} cm^2, agree well with each other and exceed the published value of 1.6×10^{-16} cm^2 by an order of magnitude.

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