

## **Abstract**

In this thesis work examines the physical principles of fiber quantum thermometry, based on the integration of diamond photonics with advanced fiber-optic technologies. A specially designed fiber probe for fully optical thermometry was demonstrated. To do this, studies have been carried out at various centers, such as nitrogen-vacancy, silicon-vacancy and vacancy for thermometry in fiber format. Optical local temperature measurement was performed by analyzing the temperature-dependent fluorescence spectrum of color centers. The optical fiber in this wholesale umbrella combines the task of delivering laser radiation to a diamond frequency attached to a fiber tip to obtain a fluorescent response from the NV, SiV, and GeV centers in a diamond. For subsequent use in the problem of probing biological objects. Optical probe-based temperature measurement (ODMR) in central nitrogen-vacancy (NV) colors in diamond at the fiber end. Measurement of temperature in the mouse brain in vivo.