Development of a scanning nitrogen vacancy magnetometry probe combined with a tuning-fork-based AFM

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The quantum states of diamond's nitrogen-vacancy (NV) center have proved their ability for magnetic field, electric field, and temperature sensing [1]. As an interesting microscope system, scanning NV probe microscopy with a pillar-shaped diamond probe containing NV centers to the apex of a diamond scanning probe working also as a tuning fork-based atomic force microscopy (Fig. 1) has been developed, enabling local probing and imaging of magnetic structures and spin dynamics [2-5]. On the other hand, this scanning NV magnetometry probe has drawbacks regarding durability, background spin noise at the diamond pillar probe surfaces, and so on. The probable method to solve these problems and have high-quality scanning NV probes will be discussed.

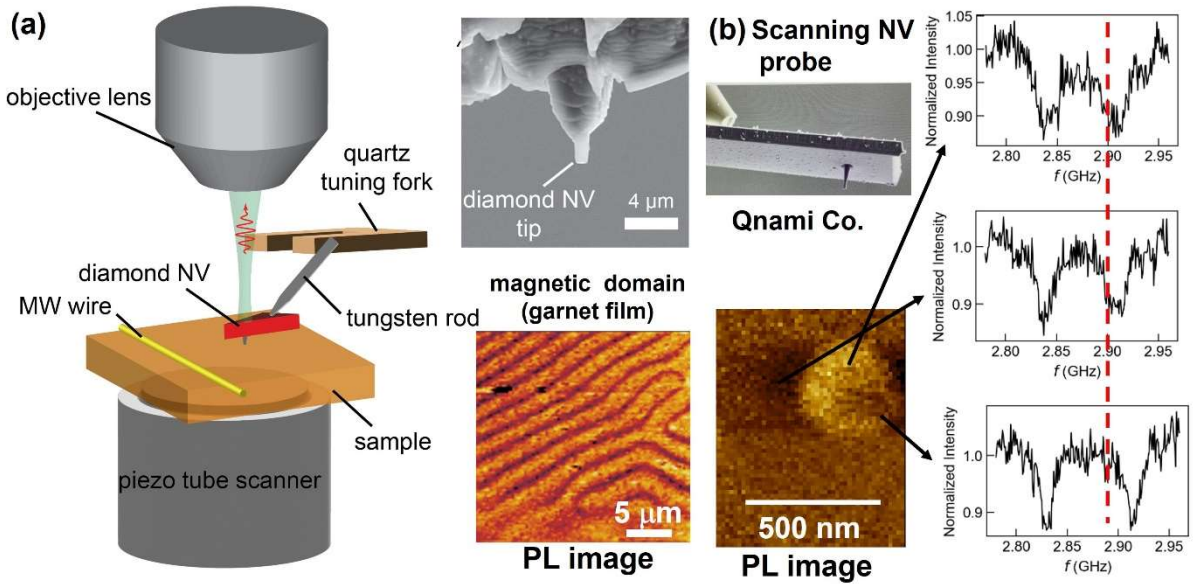

Figure 1. (a) A scanning NV magnetometry probe combined with a tuning fork AFM system. (b) Imaging of local magnetic structure and local detection of position-dependent NV's optically detected electron spin magnetic resonance signal.

References

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