Nanodiamonds and nanophosphors for quantum enhanced bio-sensing

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In this talk I highlight new ways to grow diamond that promise near-deterministic design of fluorescent color-centers, optimized for quantum-enhanced sensing. Briefly, diamonds are grown around diamond-like organic seed molecules to give unprecedented control over the number and placement of color centers. I also discuss our plans to grow complete quantum registers, inside nanodiamonds, by this technique. Finally I show how nanophosphors, primarily those employing upconversion, can be combined with nanodiamonds for multi-modal biosensing applications, using the example of local temperature sensing.