

## Research Project

### Spin-NANO

#### **Third-party funded project**

**Project title** Spin-NANO

**Principal Investigator(s)** Warburton, Richard ;

**Co-Investigator(s)** Loss, Daniel ;

**Organisation / Research unit**

Departement Physik / Experimental Physics (Warburton)

**Project Website** <http://spin-nano.sites.sheffield.ac.uk/>

**Project start** 01.01.2016

**Probable end** 31.12.2019

**Status** Completed

This network brings together an exceptionally strong team of world-leading experts in nano-science and technology from 6 European countries in order to achieve breakthroughs in understanding and successful utilization of nanoscale solid-state spin systems in emerging quantum technologies. The proposed innovative science in the supra-disciplinary field of physics and applications of spin nano-systems will underpin breakthrough developments in quantum computing, quantum communications and networks, and nano-imaging. An important innovative step consolidating the joint effort of the whole consortium in the studies of spin nano-systems is the focus on crystalline solids where detrimental magnetic interactions of electron spins with lattice nuclei are negligible and wellcontrolled. We will develop electrically-controlled spin-quantum-bits (qubits) in Si-Ge quantum dots and nanowires; will optically manipulate spin impurities in diamond in applications for quantum computing and networks and in nano-magnetometry; will achieve new understanding of quantum phenomena due to the spinvalley coupling in atomically thin 2D semiconductors, an emerging class of materials with a promise for quantum technologies using a new quantum degree of freedom, the valley index. Such wide material base emphasizes the truly multidisciplinary character of this collaboration opening opportunities for crossing the boundaries between several areas of solid-state physics and technology. The consortium of 14 academic and 7 industrial groups will deliver top international level multidisciplinary training to 15 early stage researchers, offering them an extended program of multinational exchanges and secondments. Network-wide training course in transferable skills will be specially developed and delivered by the Think Ahead (Sheffield), an award winning programme supporting Early Career Researchers (award by the Times Higher Education, 2014). The new network builds on the success of FP7 ITN S3NANO (also coordinated by A Tartakovskii), which has delivered excellent training to 16 researchers as well as state-of-the-art nano-science and technology. The current proposal is designed to advance this multidisciplinary research field significantly beyond the state-of-the-art, and train a new cohort of researchers capable of developing spin-based solid-state quantum technologies towards real-life applications in the next 5 to 10 years.

**Financed by**

Commission of the European Union

**Add publication**

**Add documents**

**Specify cooperation partners**