
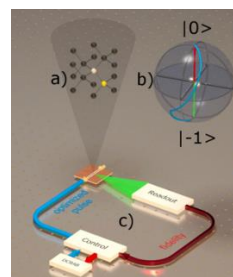
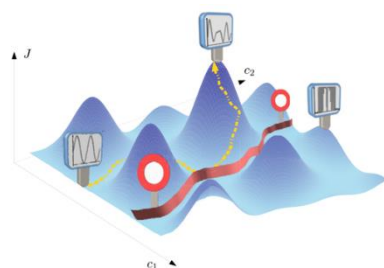


**Monday, 21 October 2024**Lecture Hall N24/H13, at 16:15  
Coffee and cookies will be served in front of the lecture hall from 16:00**Optimizing Controls for Nitrogen-Vacancy Center  
Based Quantum Technologies****Dr. Ressa Said**

Institute for Quantum Optics, Ulm University

 <https://www.uni-ulm.de/navi/institut-fuer-quantenoptik/ag-prof-jelezko/mitglieder/mitglieder-1/>

High fidelity and robust quantum operations are essential for the development of room temperature spin-based quantum technologies. As the operations rely on external fields controlling the system, optimizing the controls becomes paramount. It is a highly non-trivial task requiring in-depth knowledge of system dynamics and system-environment interactions as well as experimental limitations. In this talk, I will begin with reviewing the bare essentials of optimal control theory and their numerical implementations to provide a versatile optimization tool that is capable of encompassing experimental constraints while maintaining access to a typically trap-free control landscape [1]. Several experiments with nitrogen-vacancy center spins exploiting this powerful tool will be briefly discussed to highlight its role in enabling quantum technological applications [2]. Furthermore, I will present recent collaborative efforts to improve the optimization performance [3], and to explore the challenges of applying the control optimization in more advanced scenarios [4].



- [1] M.M. Müller, R.S. Said, F. Jelezko, et.al., Rep. Prog. Phys. 85, 076001 (2022).
- [2] e.g. J. Scheuer, X. Kong, R. S. Said, et.al., New J. Phys. 16, 093022 (2014); F. Frank, T. Uden, J. Zoller, R. S. Said, et.al., npj Quant. Info. 3, 48 (2017).
- [3] J. Tian, H. Liu, Y. Liu, P. Yang, R. Betzholtz, R.S. Said, et.al., Phys. Rev. A 102, 043707 (2020); J. Tian, R.S. Said, et.al., Sensors 23, 3244 (2023).
- [4] e.g. J. Tian, H. Liu, R. Sailer, L. Xiao, F. Jelezko, and R.S. Said, Phys. Rev. A 109, 022614 (2024).

Host: Prof. Dr. Fedor Jelezko, Institute of Quantum Optics

Organisation: Prof. Dr. Jens Michaelis, Institute of Biophysics, jens.michaelis@uni-ulm.de, +49-731-50-23050