

## Molecular Entangled 2-Photon-Sources

Initiative: Momentum - Förderung für Erstberufene

Bewilligung: 10.04.2023

Laufzeit: 4 Jahre

Molecular Entangled 2-Photon-Sources In this endeavour the Steffen lab, who has a major focus on metal complex chemistry in established 1-photon-processes for organic light emitting diodes or single-photon sources, will move towards quantum technologies at the interface between synthetic chemistry and quantum correlation. The main goal is to establish a new quantum technological platform for quantum communication by creating a deterministic, on-demand 2-photon source using chemical molecular design. This source would have tremendous advantages in comparison to traditional 2-photon source, which are either very stochastic or high in energy demand. A deterministic, on-demand 2-photon source would allow for easy access to entangled photons, which are an important basis for the development of various quantum technologies, such as quantum cryptography for ultra-secure data lines, quantum communication and quantum computing. This high-risk approach will be carried out in collaboration with physicists, in which the postdocs and technicians with spectroscopy and synthesis skills will do the pioneering work and, once specific milestones have been reached, doctoral, master and bachelor students will be integrated into the work in subprojects. The sustainable implementation of this research will be supported by integration of the fundamentals of quantum technologies in advanced Chemistry Master degree courses, as well as by advertising an interdepartmental lecture series that is currently being prepared together with the Physics Department at TU Dortmund.

### Projektbeteiligte

#### **Prof. Dr. Andreas Steffen**

Technische Universität Dortmund  
Fakultät für Chemie und Chemische Biologie  
Lehrstuhl für Anorganische Chemie  
Dortmund