

Tomo Mani, PhD

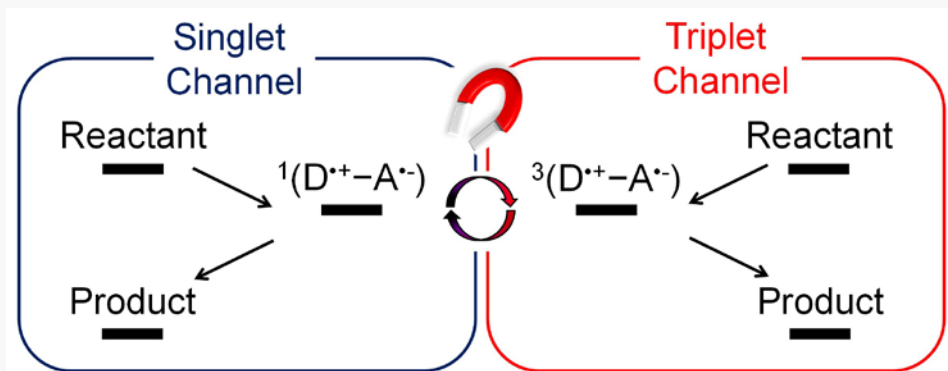
Associate Professor, Chemistry, UConn

Joint Appointment Chemist, Chemistry, Brookhaven National Laboratory

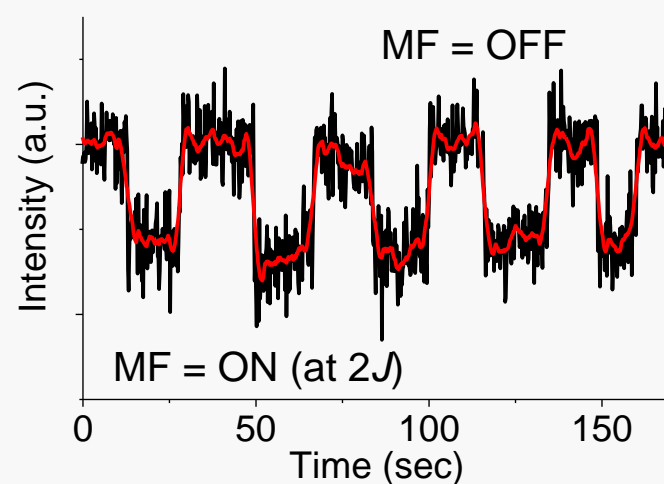
Expertise and Core Strengths

Physical Chemistry (optical/electrochemical characterizations) and Chemical Synthesis (small molecules). The main research areas are photochemistry/physics, radiation chemistry, electron transfer reactions, and spin chemistry.

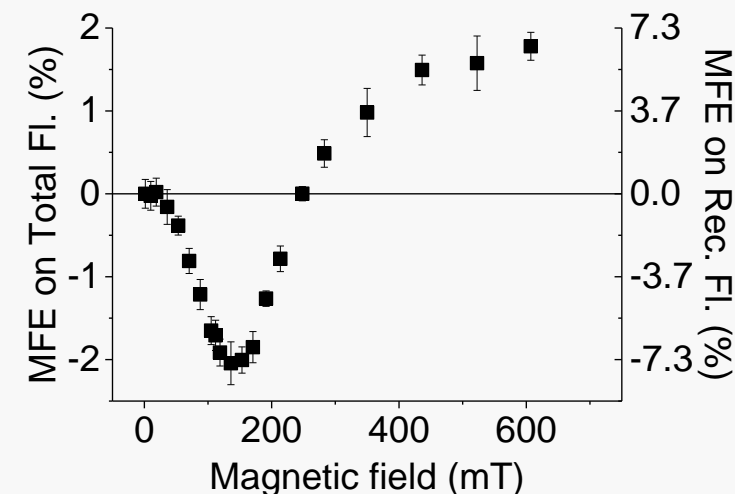
- 1) Photo-generated spin-correlated radical pairs (SCRPs)-based molecular qubits. These molecular qubits can work at room temperature in solutions and/or solids. We are developing new magnetic sensor/switch based on organic materials for biomedical/materials applications.
- 2) Triplet excited states-mediated electron and nuclear spin polarization.



SCRPs-based molecular qubits.
Chem. Phys. Rev. 3, 0213101 (2022)



Modulation of molecular emission in solutions at room temperature by magnetic field. *J. Am. Chem. Soc.*, 20691 (2020)



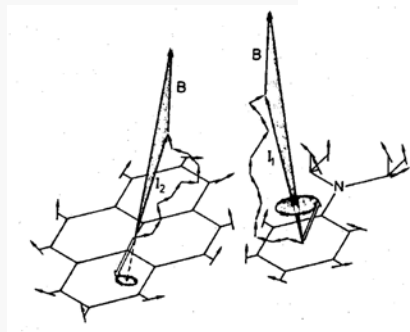
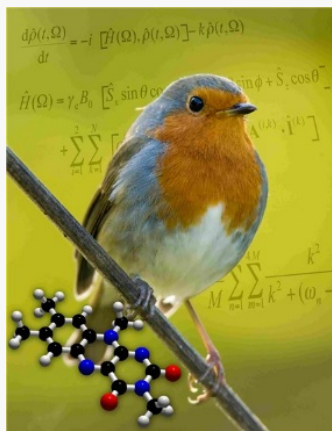
What Excites you about Quantum Technologies

Quantum effects enable new technologies. We are approaching quantum technologies from the Chemists/Chemistry perspectives. We embed quantum functionalities into molecules/materials.

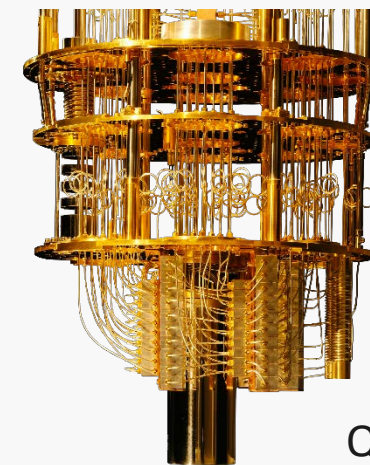
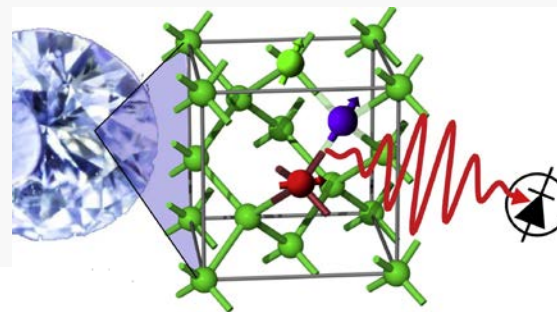
- Development of molecular qubits for **quantum sensing** applications.
- Application of quantum computers to chemical problems.



Quantum Biology
Origin of Life



Quantum Sensing
Chemical Approach



Quantum
Computers

Collaboration Ideas

- 1) Magnetic sensors and/or switches based on SCRPs. Our recent molecules have large magnetic response, and we can perform readout with molecular emission (visible light excitation/emission).
 - Integration into materials (polymers, 2D materials, alignments, etc...) for sensor applications.
 - Further optimizations of molecules: changing the field sensitivities etc...
 - Testing electric field sensitivity.
- 2) Triplet excited states-mediated electron and nuclear spin polarization for improving Nuclear Magnetic Resonance (NMR)/Magnetic Resonance Imaging (MRI).
- 3) Application of quantum computers to chemical problems.