

**Q5: Are we confident that quantum spin microscopy will work?**

**A5: Simulation techniques in NP are a mission-critical requirement**

engineering complexity classes

- **P:** derive and check using polynomial memory and time resources
  - E.g., compute a transfer function
- **NP:** via a decision “certificate”, verify with polynomial resources

**Simulation techniques in NP are a mission-critical requirement for quantum system engineering**



**NP-hard**



**EXP**

(“virtual rollouts”)

- **EXP:** emulation requires exponential resources, and no certificates known
  - problems in EXP are inaccessible
  - **Quantum system engineering must move from EXP to P**