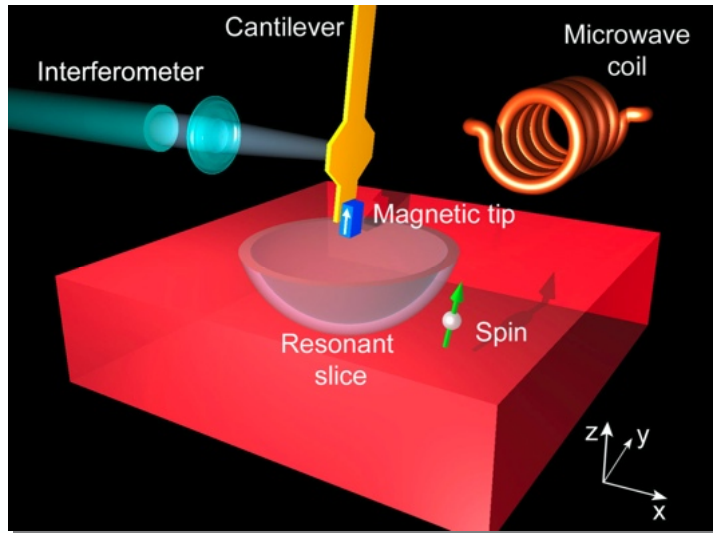


# The Quantum System Engineering Roadmap: FAQ

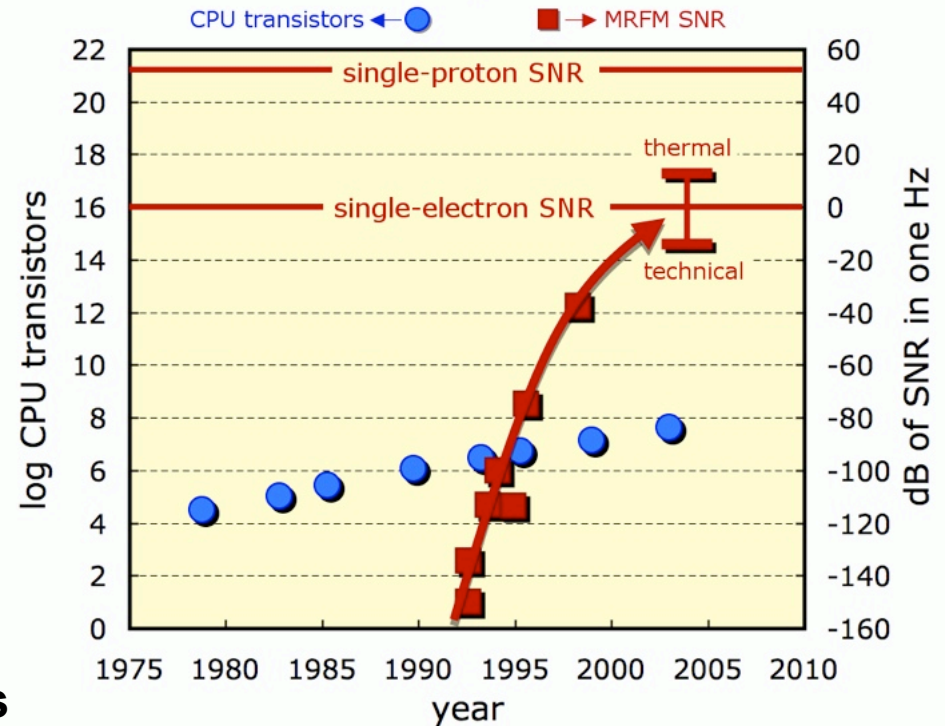
**Q3: What is a reliable technical path to practical quantum spin microscopy?**

**A3: The path is smaller, colder, quieter device generations**



- MRFM sensitivity has improved by 140 dB in twelve years
- Equivalent to doubling sensitivity every 3.1 months for 46 doublings
- MRFM has Moore's Scaling: smaller, colder, quieter devices work better

## Moore's Law Progress in MRFM



*Moore's Law design rules*

$$S_{\mu} = \frac{m}{g^2\tau} 2k_{\text{B}}T \begin{cases} m & \text{cantilever mass} \\ T & \text{temperature} \\ g & \text{magnetic gradient} \\ \tau & \text{damping time} \end{cases}$$

- *smaller*
- *colder*
- *quieter*