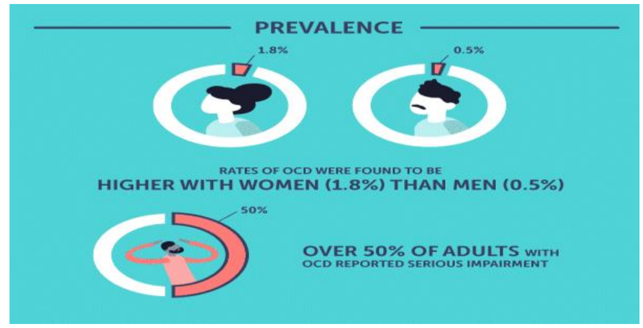
FMRI quantum precession scanner for OCD imaging



This device uses quantum sensors with FMRI which detect minute magnetic field at high speed neural activity and improve spatial resolution giving more details which can't be done using FMRI

The goal is to develop quantum sensors that can surpass the **Heisenberg Uncertainty Principle**, which restricts the simultaneous precision of position and momentum measurements in classical systems. By exploiting quantum properties like **entanglement** and **coherence**, these sensors will enable real-time, high-resolution imaging of OCD-related neural activity.

Challenges We Faced

1. Limitations of Traditional fMRI:

Traditional fMRI systems measure brain activity indirectly by tracking blood oxygen levels (BOLD signals). This process introduces a delay, making it difficult to capture fast neural activity.

Solution: We used quantum sensing technology to directly detect electrical signals from neurons, allowing us to measure brain activity in real-time with high precision.

2. Energy Conservation Challenges in Practical Applications:

Quantum technologies often require a lot of power, which can be a problem in real-world applications.

Solution: We designed low-power algorithms and implemented a dynamic energy allocation system. This system focuses energy on critical components only when needed, which significantly reduces energy usage.

Methodology: breaking Heisenberg's Uncertainty Principle

Quantum Sensor Development	Integration with fMRI	Data Analysis

Expected outcomes

- Revolutionary fMRI system that breaks classical physics limitations, achieving superior spatial and temporal resolution
- A detailed map of OCD-related neural circuits, improving diagnostic accuracy.
- Well known mechanisms of OCD.

References: Giovannetti, V., Lloyd, S., & Maccone, L. (2004). *Quantum-Enhanced Measurements: Beating the Standard Quantum Limit*.
Milad, M. R., & Rauch, S. L. (2012). Obsessive-compulsive disorder: Beyond segregated cortico-striatal pathways. In *Trends in Cognitive Sciences* (Vol. 16, Issue 1, pp. 43–51). https://doi.org/10.1016/j.tics.2011.11.003.