

**FM 68: Plenary Talk: Silicon Based Quantum Computing**

Time: Thursday 8:30–9:30

Location: Audi Max

**Plenary Talk** FM 68.1 Thu 8:30 Audi Max  
**Silicon Based Quantum Computing** — •MICHELLE SIMMONS —  
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Down-scaling has been the leading paradigm of the semiconductor industry since the invention of the first transistor in 1947. However miniaturization will soon reach the ultimate limit, set by the discreteness of matter, leading to intensified research in alternative approaches

for creating logic devices. One of the most exciting of these is quantum computation. We will present devices that address the ultimate limit of device miniaturization in silicon where we have patterned dopants in a crystalline environment with atomic precision to act as one dimensional leads, single electron transistors and control gates. During this talk I will focus on demonstrating fast, high fidelity single-shot spin read-out, ESR control of precisely-positioned P donors in Si and our recent results to demonstrating a two-qubit gate. We will discuss the benefits of donors as qubits and show our progress to achieving truly atomically precise devices in all three spatial dimensions.