

# THE ATOMIC FORGE

A **SCANNING TRANSMISSION ELECTRON MICROSCOPE (STEM)** fires a beam of electrons through a sample of material to pinpoint atoms and reveal the material's crystal structure. For imaging, the downside is that the beam can move atoms slightly. But if these modifications can be controlled, it could be a boon. New materials could be built atom by atom by controlling the electron beam precisely. Such bespoke materials might enable new classes of devices for quantum computing, spin sensing and more.

## PRECISE BEAM

A beam delivers a prescribed dose of electrons to a particular site in a crystal for a certain length of time to move an atom as desired.

## BEAM CONTROL

Open-source software gives researchers full control over the precision, velocity and power of the electron beam.

## FEEDBACK SYSTEM

A powerful computer analyses the detector data in real time and decides how to control the beam to make the next atomic move.

## FAST DETECTOR

Information about the sample's atomic structure is gathered in real time by detectors with many pixels.

## NEW MATERIALS

By testing new atomic architectures, researchers will be able to design materials with specific properties and learn more about interactions between the beam and sample.