Ultrafast electron diffraction (UED) is a powerful technique that lets us measure the positions of atoms in a crystal as they evolve during chemical and physical transformations. These measurements can give insight into how materials work on a microscopic level, as well as guide the design of devices that respond on fast timescales. For some time, the best-available time resolution in UED has hovered around 100 fs (1 fs = 10^-15 s), just shy of the 10 fs resolution required to see the fastest atomic motions. In my talk, I’ll explain how ultrafast electron diffraction works and why it’s challenging to break the 100-fs resolution barrier. I’ll discuss a new technique that uses terahertz electromagnetic fields to compress electron pulses in time. This technique has the potential to improve the resolution of UED below 100 fs and maybe even below ~1 fs, into the regime of electronic dynamics.

ABSTRACT:
Ultrafast electron diffraction (UED) is a powerful technique that lets us measure the positions of atoms in a crystal as they evolve during chemical and physical transformations. These measurements can give insight into how materials work on a microscopic level, as well as guide the design of devices that respond on fast timescales. For some time, the best-available time resolution in UED has hovered around 100 fs (1 fs = 10^-15 s), just shy of the 10 fs resolution required to see the fastest atomic motions. In my talk, I’ll explain how ultrafast electron diffraction works and why it’s challenging to break the 100-fs resolution barrier. I’ll discuss a new technique that uses terahertz electromagnetic fields to compress electron pulses in time. This technique has the potential to improve the resolution of UED below 100 fs and maybe even below ~1 fs, into the regime of electronic dynamics.

McCook Auditorium
Friday, September 23rd @ 3:00PM
(refreshments will be offered @ 2:45 pm)