How to look at a superconductor and see the Higgs mechanism

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ABSTRACT:
Among the most fascinating topics in modern physics is the phenomenon of high-temperature superconductivity. Unfortunately, high-TC superconductors belong to the most complicated systems studied in solid state physics, displaying a wide variety of different phenomena throughout their phase diagram that compete with the emergence of the superconducting state. While there is an ongoing drive to find ever more superconducting materials with ever higher critical temperatures, our understanding of the fundamental mechanisms is still limited, despite an immense effort by the research community.
In my talk, I will show that optical experiments can reveal a great deal of information on the workings of superconductors. Using time-resolved broadband spectroscopy, it is possible to excite a superconductor in very specific ways, and the observation of its out-of-equilibrium behavior allows understanding its inner workings. I will show that is possible to trigger a coherent fluctuation of the superconducting condensate and explain what we can learn from its response to the excitation. Curiously, the response of the superconductor can be described by the Anderson-Higgs formalism, the very same concept that lies at the core of our attempt to understand why matter has mass.

McCook Auditorium
Friday, April 10th @ 3:00PM
(refreshments will be offered @ 2:45 pm)