Plenary Talk PV X Fri 9:00 E415

Lightwave electronics in trivial, topological, and strongly correlated solids — •Misha Ivanov — Max Born Institute, Berlin, Germany

Modern light generation technology has evolved to the point where a theorist may reasonably expect an experimentalist to generate light pulses where individual oscillations of the electric field are shaped almost at will. Control of the carrier-envelope phase of few-cycle pulses is now almost routine. One can also reliably generate complex polarization states in two and three dimensions, sculpting the Lissajous figures drawn by the electric field vector during a single optical cycle. As these fields can be made strong enough to compete with the internal electric fields in a medium, coherent electronic motion can be excited and shaped almost at will, at the time-scale of a single light oscillation. How can we use such opportunities? What happens to a crystal exposed to such light? Do we change its effective band structure and density of states? Can these changes be controlled?

I will address these questions by considering several examples, ranging from trivial to topological to correlated solids, showing how our ability to control light on the sub-cycle time-scale leads to interesting and often unexpected results.