

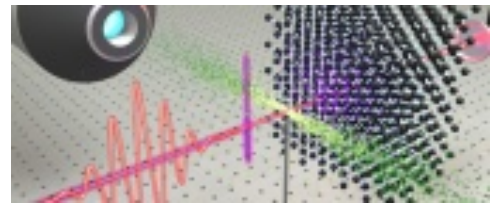


Molecular Ultrafast  
Science and Technology  
National Center of Competence in Research



## Electrons at the speed limit

Electronic components have become faster and faster over the years, thus making powerful computers and other technologies possible. Researchers at ETH Zurich have now investigated how fast electrons can ultimately be controlled with electric fields. Their insights are of importance for the petahertz electronics of the future.



From the Science website: "Conceptually, the electronic structure of matter is a fixed scaffold of energy levels, which electrons climb with the help of light absorption. In reality, the light's electromagnetic field distorts the scaffold, a phenomenon that becomes increasingly evident with rising field intensity. Lucchini et al. studied a manifestation of this phenomenon, termed the dynamical Franz Keldysh effect, in diamond substrates exposed to sudden, moderately intense infrared fields. Using attosecond probe pulses and accompanying theoretical simulations, they resolved and accounted for the extremely rapid ensuing electron dynamics."

**Lucchini, M.**, Sato, S.A., Ludwig, A., Herrmann, J., Volkov, M., Kasmi, L., Shinohara, Y., Yabana, K., **Gallmann, L.**, **Keller U.** Attosecond dynamical Franz-Keldysh effect in polycrystalline diamond. Science 2016, published online 25th August. DOI: 10.1126/science.aag1268

Also: see our [Highlights](#) page

### [Attosecond dynamical Franz-Keldysh effect in polycrystalline diamond](#)

**ETH News**

Download  [Lucchini-2016](#) (1.87 MB)