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Electron acceleration at a dielectric structure: updates from the lab

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After the initial proof-of-concept experiments by the Stanford/SLAC and Erlangen/MPQ groups in 2013 demonstrating dielectric laser acceleration (DLA) at silica structures, we here give an overview over recently achieved results from the lab. They include acceleration at higher spatial harmonics, which will allow for smaller initial electron injection energy down into the single-digit keV region. This might allow for extremely compact beam sources. Furthermore, we will show results on electron acceleration at silicon structures with 2-micron pulses derived from a femtosecond fiber laser, which may turn out to be ideal to take advantage of the outstanding nanofabrication technology available for silicon. More results are expected and will be presented. An outlook will be given with an emphasis on scaling of DLA technology.

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