



Physikalisches Kolloquium Einladung

Physics Colloquium Invitation

Monday, 11 February 2019, Lecture Hall N24/H13, 16:15

Coffee and cookies will be served in front of the lecture hall from 16:00

Particle acceleration with laser-driven photonic structures

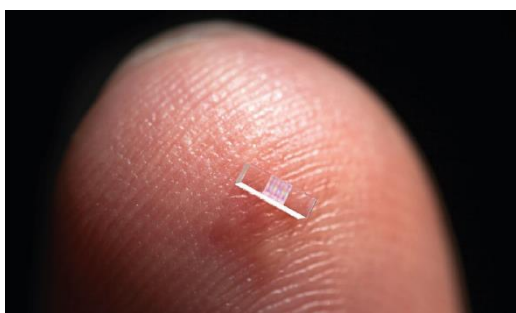
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Particle accelerators have a variety of uses from fundamental science and medical applications to semiconductor manufacturing, and they are often thought of as large, expensive facilities or instruments. The ambitious Accelerator on a Chip International Program (ACHIP), funded by the Gordon and Betty Moore Foundation, aims to use advances in fabrication and laser technologies to create a shoebox-sized particle accelerator that is a nano-photonic version of classical accelerators.

With the help of transparent dielectric nanostructures, pulsed laser fields can accelerate electrons propagating in the nearfield of these structures to realize a principle identical to that of classical microwave accelerators, but shrunk in dimensions by around five orders of magnitude and driven with fields whose frequencies are larger by the same amount. Since the proof-of-concept experiments in 2013, the ACHIP team has now demonstrated all the elements required for building the "accelerator on a chip" including deflection and beam steering, as well as optical focusing and beam position monitors. Stable particle transport and acceleration from sub-100 keV up to 1 MeV has recently been conceived, putting the team even closer to one of the ACHIP goals of attaining a 1 MeV electron beam from a millimetre long chip.



Picture credit: Byer, England/SLAC

Photonic accelerator chip on a fingertip