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Cameron Geddes is a staff scientist in the BELLA Center at Lawrence Berkeley National Laboratory (which he joined in 2000), investigating the use of laser driven plasma waves to build compact next-generation particle accelerators and photon sources. His work includes compact sources of near-monochromatic MeV photons for nuclear applications as well as extending the future reach of high-energy physics and sources of radiation in the X-ray to THz bands.

Geddes received the Ph.D. in Physics in 2005 at the University of California, Berkeley, supported by the Hertz Fellowship. He received the B.A. in Physics with high honors from Swarthmore College in 1997.

Professional experience

8/2008 – present: Staff scientist, BELLA Center, LBNL.

4/2005-8/2008: Research Scientist, LOASIS Program, LBNL.

6/2000 - 3/2005: Ph.D. Research Assistant, University of California, Berkeley.

9/1999 - 5/2000: Physicist (contractor), Polymath Research.

11/1997-8/1999: Physicist, plasma group, Lawrence Livermore National Laboratory.

6/1996-6/1997: Research Assistant, Spheromak plasmas, Swarthmore College.

9/1995-12/1995: Associate Scientist, Silicon detectors, LBNL.

6/1995-9/1995: Research Ast., Tokamak plasmas, Princeton Plasma Physics/U. Wisc.

6/1993-6/1995: Research Assistant, fiber optics, Swarthmore College.

Awards

2016: Fellow of the American Physical Society

2010: John Dawson Award for Excellence in Plasma Physics Research, "For experiments and theory leading to the demonstration of high-quality electron beams from laser-plasma accelerators."

2007: Outstanding Performance Award, LBNL.

2006: APS Marshall N. Rosenbluth Outstanding Doctoral Thesis Award.

2005: Outstanding Performance Award, LBNL.

2005: Hertz Thesis Prize, Hertz Foundation.

2000-2004: Hertz Graduate Fellowship, Hertz Foundation

1999: National Defense Science & Engineering Graduate Fellowship, U.S. D.O.D.

1997: Apker Award, American Physical Society, undergraduate thesis in physics.

1997: Elmore Prize, Swarthmore College, for distinguished academic work in physics

1995: National Undergraduate Fellowship in Plasma Physics, U.S. Dept. of Energy.

Selected publications

Full list of more than 130 at http://geddes.lbl.gov: >3900 citations, h-index 22.

1. S. Steinke, et al., "Multistage coupling of independent laser-plasma accelerators," Nature 530, pp 190–193 (2016)
2. C.G.R. Geddes, et al., "Compact quasi-monoenergetic photon sources from laser-plasma accelerators for nuclear detection and characterization," Nuclear Instruments and Methods in Physics Research B 350, 116 (2015).
3. W. P. Leemans, et al., "Multi-GeV Electron Beams from Capillary-Discharge-Guided Subpetawatt Laser Pulses in the Self-Trapping Regime," Phys. Rev. Letters 113, 245002 (2014).
4. G. R. Plateau, et al., "Low-emittance electron bunches from a laser-plasma accelerator measured using single-shot X-ray spectroscopy," Phys. Rev. Letters 109, 064802 (2012).

A. J. Gonsalves, et al., "Tunable laser plasma accelerator based on longitudinal density tailoring," Nature Physics 7, 862 (2011).

5. J.-L. Vay, et al., "Effects of hyperbolic rotation in Minkowski space on the modeling of plasma accelerators in a Lorentz boosted frame," Phys. Plasmas Letter 18, 030701 (2011).
6. C.G.R. Geddes, et al., "Laser Plasma Particle Accelerators: Large Fields for Smaller Facility Sources," SciDAC Review 13, pp. 13 (2009). (cover)
7. C.G.R. Geddes, et al., "Stable low momentum spread electron bunches from plasma density gradient injection," PRL V 100, 215004 (2008).
8. E. Cormier-Michel, et al., "Unphysical kinetic effects in laser wakefield accelerators modeled with particle-in-cell codes," Phys. Rev. E. V 78, 016404 (2008).
9. W.P. Leemans, et al., "GeV electron beams from a centimetre-scale accelerator," Nature Physics, V 2, pp. 696-9 (2006).
10. J. van Tilborg, et al., "Temporal characterization of femtosecond laser-plasma-accelerated electron bunches using terahertz radiation". Phys. Rev. Lett., V 96, no. 1, pp. 014801/1-4 (2006).
11. C.G.R. Geddes, et al., "Guiding of Relativistic Laser Pulses by Preformed Plasma Channels," Phys. Rev. Lett., V 95, no. 14, pp. 145002/1-4 (2005).
12. C.G.R. Geddes, et al., "Production of high quality electron bunches by dephasing and beam loading in channeled and unchanneled laser plasma accelerators," Physics of Plasmas, V 12, pp. 056709/1-10 (2005).
13. W.P. Leemans, et al., "Radiation from Laser Accelerated Electron Bunches: Coherent Terahertz and Femtosecond X-Rays," IEEE Trans. Plasma Sci., vol. 33, pp. 8-22 (2005).
14. C.G.R. Geddes, et al., "High-quality electron beams from a laser wakefield accelerator using plasma-channel guiding," Nature, V 438, pp. 538-41 (2004). (cover)
15. C.G.R. Geddes, et al., "Observation of ion wave decay products of Langmuir waves generated by stimulated Raman scattering in ignition scale plasmas," Physics of Plasmas, V 10, no. 8, pp.3422-25 (2003).
16. C.G.R. Geddes, et al., "Scaling studies of spheromak formation and equilibrium," Physics of Plasmas, V 5, no. 4, pp. 1027-34 (1998).