



Project: A compact plasma beam dump for next generation particle accelerators.

Supervisor: Dr. Guoxing Xia.

Duration: 24 Weeks, 2018-19.

Location: The University of Manchester,
Cockcroft Accelerator Group,
Manchester, UK.

Week 1

First meeting with Guoxing: Discussed project outline, necessary background reading and the EPOCH software.

Received documents from Guoxing: LFWA PhD thesis [1], PWFA and beam dump papers [2, 3, 4, 5, 6, 7] and EPOCH users manual [8].

Week 2

References

- [1] Shao-Wei Chou. Investigation of electron acceleration and deceleration in plasmas. 2016.
- [2] A. Bonatto, C. B. Schroeder, J. L. Vay, C. G.R. Geddes, C. Benedetti, E. Esarey, and W. P. Leemans. Passive and active plasma deceleration for the compact disposal of electron beams. *Physics of Plasmas*, 22(8), 2015.
- [3] A. Bonatto, C. B. Schroeder, J. L. Vay, C. R. Geddes, C. Benedetti, E. Esarey, and W. P. Leemans. Compact disposal of high-energy electron beams using passive or laser-driven plasma decelerating stage. *AIP Conference Proceedings*, 1777(1):0–5, 2016.
- [4] W. Lu, C. Huang, M. M. Zhou, W. B. Mori, and T. Katsouleas. Limits of linear plasma wakefield theory for electron or positron beams. *Physics of Plasmas*, 12(6):1–8, 2005.
- [5] H. C. Wu, T. Tajima, D. Habs, A. W. Chao, and J. Meyer-ter Vehn. Collective deceleration: Toward a compact beam dump. *Physical Review Special Topics - Accelerators and Beams*, 13(10):1–8, 2010.
- [6] S. Chou, J. Xu, K. Khrennikov, D. E. Cardenas, J. Wenz, M. Heigoldt, L. Hofmann, L. Veisz, and S. Karsch. Collective Deceleration of Laser-Driven Electron Bunches. *Physical Review Letters*, 117(14):1–5, 2016.
- [7] Kieran Hanahoe, Guoxing Xia, Mohammad Islam, Yangmei Li, Öznur Mete-Apsimon, Bernhard Hidding, and Jonathan Smith. Simulation study of a passive plasma beam dump using varying plasma density. *Physics of Plasmas*, 24(2), 2017.
- [8] K. Bennett. EPOCH Users Manual for the EPOCH PIC codes, Ver. 4.3.4. 2015.