

INTERNSHIP PROPOSAL

(One page maximum)

Laboratory name: Lawrence Berkeley National Laboratory

CNRS identification code: N/A

Internship director's name: Remi Lehe

e-mail: rlehe@lbl.gov

Phone number:

Web page: <https://atap.lbl.gov/accelerator-modeling-program/>

Internship location: Berkeley, California, USA

Thesis possibility after internship: YES

Funding: YES

If YES, which type of funding: US DOE

grant

Title: Computer simulations of plasma-based particle accelerators

Summary (half a page maximum)

The Accelerator Modeling Program (AMP) is a program within Berkeley Lab that focuses on high-performance computing (HPC) to model advanced particle accelerators, laser-plasma interactions and plasma devices (including fusion devices).

With this project, the intern will have the opportunity to contribute to ongoing research and gain hands-on experience in the field of computational physics within an open and team-science driven environment. Specifically, the intern will use and/or contribute to the development of the Beam, Plasma & Accelerator Simulation Toolkit (BLAST, <https://blast.lbl.gov>), which includes the code WarpX (<https://github.com/ECP-WarpX/WarpX>), an open-source massively-parallel Particle-In-Cell code that was awarded the prestigious 2022 ACM Gordon Bell Prize. For a more detailed overview of the group's research, see the following video: https://youtu.be/V_XXXDM_ZTA?t=1

The intern will participate in the advancement of theoretical and computational beam accelerator and plasma physics, through one or more of the various activities that occur in the program, offering a wide range of possibilities:

- Investigating physics through computer simulations to support theoretical and/or experimental studies of plasma-based particle accelerators.
- Improving simulation tools for better performances on supercomputers, or for simulating new physics.
- Exploring novel numerical schemes and algorithms to improve simulations' reliability.

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: YES/NO	Soft Matter and Biological Physics: YES/NO
Quantum Physics: YES/NO	Theoretical Physics: YES/NO