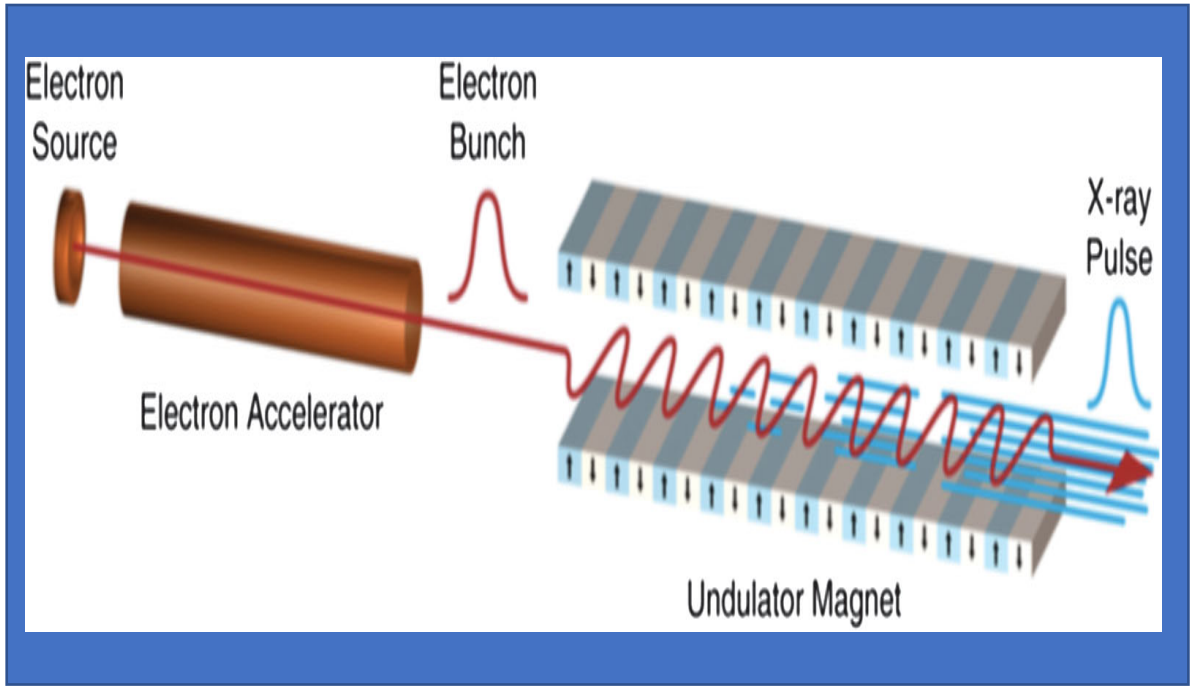
Project Goals

To build and operate a transformative compact free electron laser instrument for innovative research in the physical, biological, and chemical sciences, along with medicine on the Yale campus.



Resources Needed

- ***Shops:*** *Machine and Electronics Shops*
- ***Expertise:*** *Small accelerator operations*
- ***Personnel:*** *FEL operators, experiment shifters, hardware and software engineers, student and postdocs*
- ***Management:*** *Director, Budgeting, EH&S*

Largely already existing on campus!!

O.K. Baker*/Physics Department/Experimental Particle Physics at LHC and on campus*

https://hep.yale.edu/people/faculty/oliver-k-baker

Current Approach

Current on-campus resources are mostly in place for this project goals. Machine shops for professionals and properly trained students, electronics expertise, EH&S all exist in the Wright Lab. A re-orientation of the current Beam Physics Laboratory will be needed. Expertise in software development and use, as well as experimental setup and implementation exists in students and postdoctoral researchers. The FEL construction and its use will require trained personnel not all of whom are presently available at the University. The proposed approach is to partner with a major federal funding agency such as the Department of Energy in the FEL construction and operation.

An instrumentation development center would enable urgent and fundamental innovative research in STEM and medicine in a campus environment where none exists at this level at universities. **University facilities allow quick and innovative results with an on-campus (IR) light source, and a stepping stone towards a future compact x-ray FEL.**

Examples include: FEL use in understanding COVID-19 at a fundamental microscopic level. Twisted beams of electrons and photons for quantum information science R&D. Search for Beyond the standard model phenomena in experimental particle physics. It provides a great training venue for students and postdoctoral researchers.