

Workshop on Beam Acceleration in Crystals and Nanostructures

Co-Organizer : T. Tajima and V. Shiltsev

Publication of the Proceedings: World Scientific Publication
Eds. S. Chattopadhyay, G. Mourou, V. Shiltsev, and T. Tajima
deadline of papers: July 26, 2019

Workshop fees: \$22

Please pay the Workshop Fee through the touchnet:

https://secure.touchnet.net/C21570_ustores/web/classic/product_detail.jsp?PRODUCTID=1283

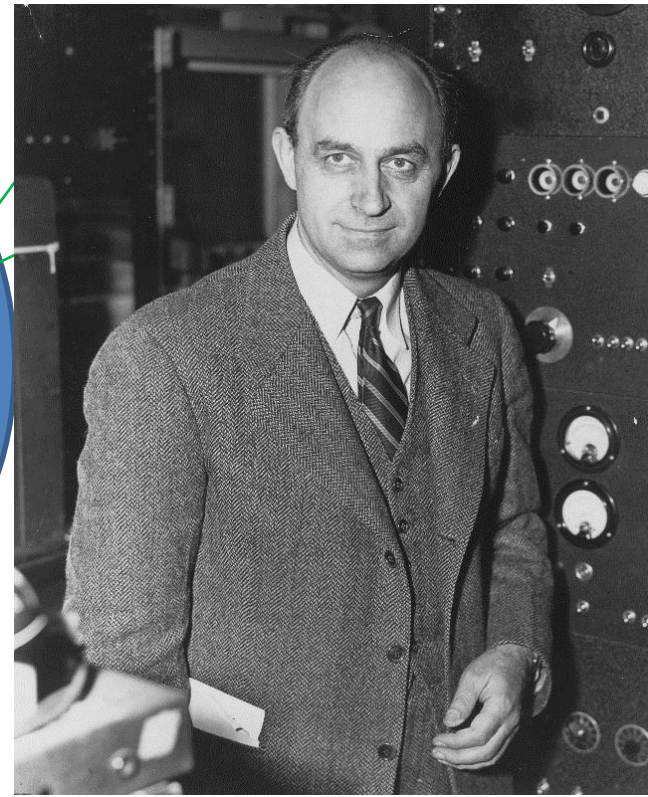
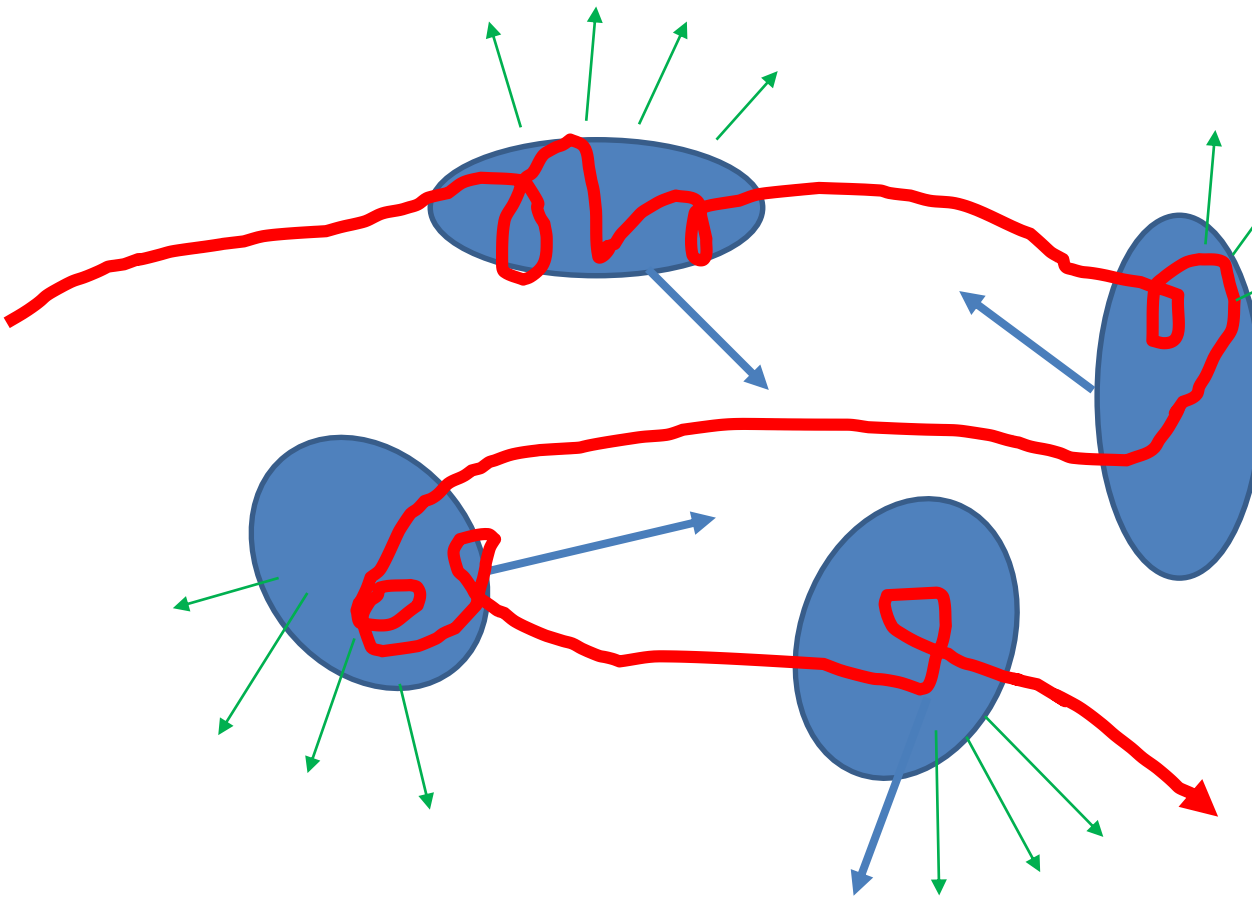
Fermi PeV Accelerator

$$\alpha = \frac{\hbar^2}{e c}$$



Fermi mechanism

E. Fermi, ApJ 119 (1954) 1.



Department of Energy.
Office of Public Affairs

(Ebisuzaki, 2019)

The late Prof. Abdus Salam



At ICTP Summer School (1981),

Salam: 'Scientists like me began feeling that we had less means to test our theory. However, with your laser acceleration, I am encouraged'. (1981)

He organized the Oxford Workshop on **laser wakefield** accelerator in 1982.

Effort: many scientists over many years to realize his vision / dream
High field science: spawned

WELCOME TO FERMILAB!

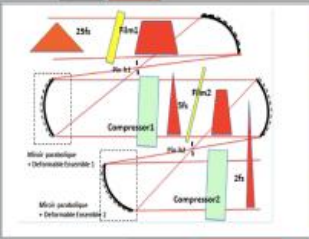
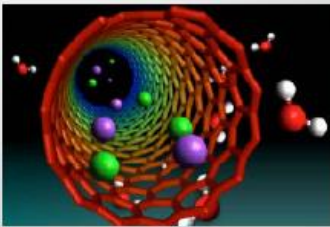
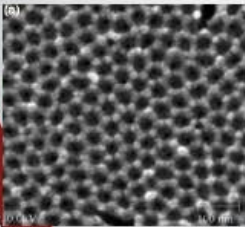
Fermilab, June 24-25, 2019

Workshop on Beam Acceleration in Crystals and Nanostructures

<https://indico.fnal.gov/event/19478/>

Organized by T. Tajima (UCI) and V. Shiltsev (FNAL)
Proc.Eds.: S.Chattopadhyay, G. Mourou, V. Shiltsev, T. Tajima

Endorsed by: APS GPAP & DPB, ICFA ANA, ICUIL, NIU



The concept of beam acceleration in solid-state plasma of crystals or nanostructures like CNTs has the promise of ultra-high accelerating gradients $O(1-10)$ TeV/m, continuous focusing and small emittances of, e.g., muon beams and, thus, may be of interest for future high energy physics colliders. The main objective of the Workshop is to assess the progress of the concept over the past two decades and discuss the key issues toward proof-of-principle demonstration and next steps in theory, modeling and experiment.

Program and Logistics

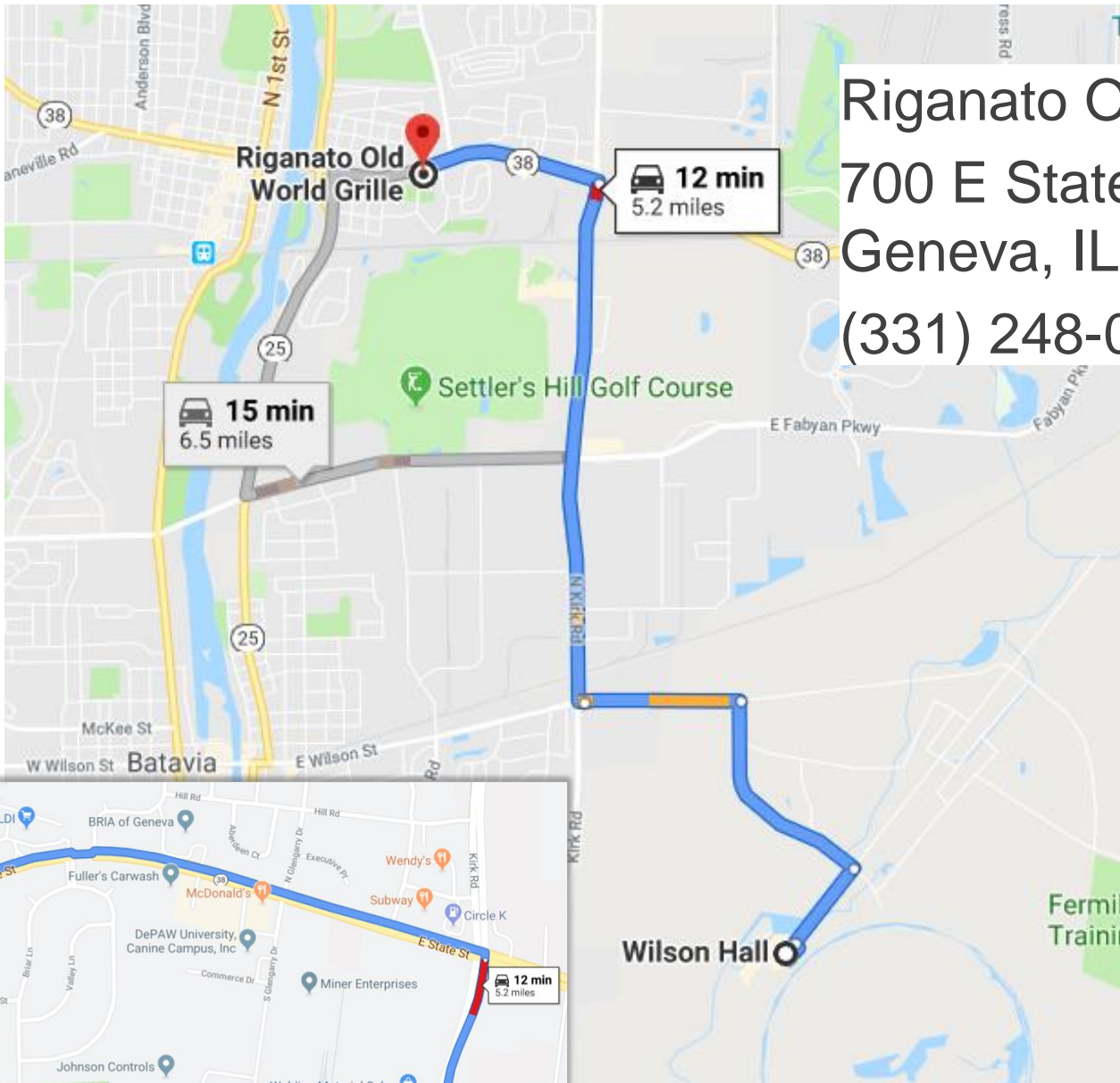
<https://indico.fnal.gov/event/19478/>

08:00	Welcome and Intro J West, Fermilab	Toshiki TAJIMA 08:00 - 08:20
	Ultimate colliders for particle physics : limits and possibilities J West, Fermilab	Dr. Vladimir SHILTSEV 08:20 - 08:50
09:00	Plasma wake-field collider issues and advantages/disadvantages of having muons and crystals/CNTs J West, Fermilab	Dr. Valeri LEBEDEV 08:50 - 09:30
	Fiber lasers as a foundation of any realistic collider base J West, Fermilab	Dr. WEIJIAN SHA 09:30 - 10:00
10:00	Coffee break J West, Fermilab	coffee here 10:00 - 10:30
	Relativistic compression technique simulation to produce X-ray laser J West, Fermilab	Dr. Natalia NAUMOVA 10:30 - 11:00
11:00	Simulation of X-ray laser propagating in nanostructure medium to excite and accelerate electrons J West, Fermilab	Ms. Sahal HAKIMI 11:00 - 11:30
	High quality electron generation using solid or liquid target driven by X ray J West, Fermilab	Mr. Zheng GONG 11:30 - 12:00
12:00	Relativistic Flying Mirrors for Intense short pulse X-ray generation J West, Fermilab	Dr. Stepan BULANDV 12:00 - 12:30
13:00	Lunch break Cafeteria, Fermilab	Lunch 12:30 - 14:00
14:00	High brightness drive beam generation and kinetic plasma instabilities relevant to acceleration in ultradense plasmas J West, Fermilab	Dr. Chaojie ZHANG 14:00 - 14:30
	Nonlinear surface charge-density waves in hollow-channels for wakefield acceleration J West, Fermilab	Dr. Aakash SAHAI 14:30 - 15:00
15:00	Thin film compression and CAN laser experimental results J West, Fermilab	Dr. Jonathan WHEELER 15:00 - 15:30
	Coffee break WH2nd floor	coffee upstairs 2 fl 15:30 - 16:00
16:00	Demonstration of thin film laser pulse compression J West, Fermilab	Dr. Deano FARINELLA 16:00 - 16:30
	Discussion J West, Fermilab	Dr. Vladimir SHILTSEV 16:30 - 17:15

09:00	Ultimate beams at FACET-II J West, Fermilab	Vitaly YAKIMENKO 09:00 - 09:30
	Status and recent results of the channelling experiments at SLAC J West, Fermilab	Dr. Ulf WIENANDS 09:30 - 10:00
10:00	Coffee break J West, Fermilab	coffee here 10:00 - 10:30
	Experience with crystals for collimation at Fermilab J West, Fermilab	10:30 - 11:00
11:00	Ultimate brightness muon sources J West, Fermilab	Katsuya YONEHARA 11:00 - 11:30
	LWFA application to endoscopic oncology J West, Fermilab	Mr. Bradley NICKS 11:30 - 12:00
12:00	FAST Tour and Lunch break	Tour FAST/IOTA Lunch NML and J West 12:00 - 14:00
14:00	Electron Acceleration at ELI-Beamlines: recent developments towards high-energy and high-repetition-rate accelerators J West, Fermilab	Dr. Carlo Maria LAZZARINI 14:00 - 14:30
	Long plasma channel formation and GeV electron acceleration or effect of nanostructured on wakefield generation and electron acceleration in plasma channel J West, Fermilab	Dr. Pawan KUMAR 14:30 - 15:00
15:00	wakefield acceleration from a black hole emanating astrophysical jets with evidence of gamma ray bursts J West, Fermilab	Dr. Toshikazu EBISUZAKI 15:00 - 15:30
	Coffee break WH2nd floor, Fermilab	coffee upstairs 2 fl 15:30 - 16:00
16:00	Fundamentals of X-ray nano materials accelerators, and recent breakthroughs in the laser technology J West, Fermilab	Prof. Toshiki TAJIMA T.Tajima seminar here 16:00 - 17:00

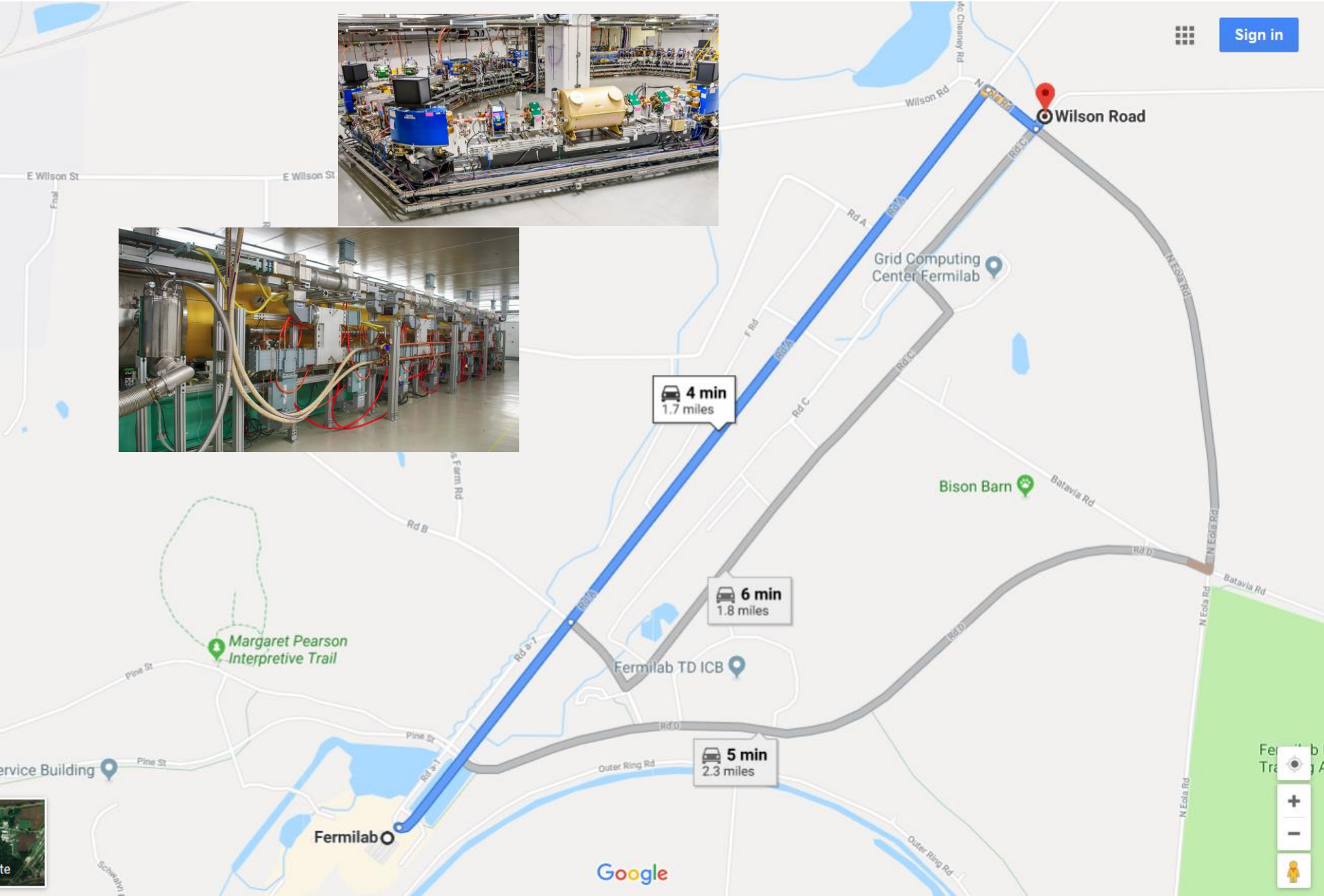
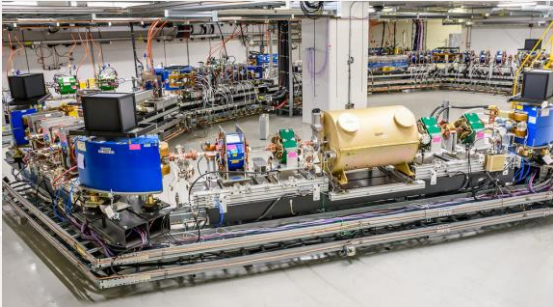
ilab

#1: Sign Up for the Dinner **Tonight 6pm** ! (out of pocket)



Riganato Old World
700 E State St,
Geneva, IL 60134
(331) 248-0191

#2: Sign Up for the FAST/IOTA Tour **Tue @ lunch !**



#3: We plan to publish **Proceedings** !

- With *World Scientific Publisher*



- **Proceedings Editors:**
 - **Swapam Chattopadhyay**
 - **Gerard Mourou**
 - **Vladimir Shiltsev**
 - **Toshiki Tajima**
- **To publish:**
 - (ideally) all 20 talks
 - Other submissions on the subject (contact us)

Sign Up for the Dinner **Tonight 6pm !**

(please provide your name by noon)

Sign Up for the FAST/IOTA Tour **Tue @ lunch !**

(please, provide your name by noon)