Oakland East Bay Nuclear and Plasma Sciences Society
Tuesday, May 18, 2010, 7:30 PM
Lawrence Berkeley Laboratory
Bldg 2, Room 100 (main conference room)

ATTENDEES MUST REGISTER IN ADVANCE

To be allowed into the gates of LBL, you will need to RSVP before Noon on Monday, May 17 with the name and email address of **each** attendee. Register this info with Bill DeHope, 925-424-6413, dehope1@llnl.gov

Click here and scroll down for maps.

The Industrial Uses of Particle Accelerators

Robert W. Hamm
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Almost half of all the particle accelerators that have been manufactured worldwide to date are used for industrial applications, with the remainder being used either for medical treatment or basic science research. These industrial accelerator systems utilize a wide range of accelerator technologies, including direct voltage systems, rf and microwave linacs, and cyclic accelerators. They accelerate either electrons or ions with energies and currents spanning more than six orders of magnitude, from keV to GeV and from nA to mA. The beam power varies from as little as a few watts to as much as 700 kW. In fact, more than 18,000 industrial accelerators have been built over the last 50 years, with most still in use.

The production of industrial accelerators is itself a worldwide business carried out by more than 65 companies and institutes. Collectively these entities ship about 1000 systems per year and have annual revenues in excess of $2 billion. While this makes a notable contribution to both the US and world economies, even more notable is that the products produced or processed by industrial accelerators have an annual sales value of about $500 billion. Their numerous applications cover a broad range of business segments from low energy electron beam systems for welding, machining, and product irradiation to high energy cyclotrons and synchrotrons for medical isotope production and synchrotron radiation production.

It is not only the high value of these products, but their importance to modern society that is impressive. For instance, ion implantation accelerators are used to produce the modern integrated circuit chips that are used in virtually all electronics, such as cell phones, computers, game stations, PDAs, MP3 players, etc. Modern-day reliable tires, transmission parts and many other components of motor vehicles and aircraft are produced using electron accelerators, as are shrink-wrap packaging for food and coatings for electrical wire and cable. Electron accelerators are used to sterilize disposable medical products and even some foods. They also produce laminated surfaces for furniture and cure coated surfaces. Ion accelerators are used in the commercial production of medical radioisotopes for disease diagnostics and treatment. Accelerators also provide services for the inspection of many materials, such as for forensic science and homeland security. This talk is a review of the current status of this business worldwide, including the technologies, the applications, the vendors and the market sizes.

Robert W. Hamm

For the past 40 years, Robert has been active in the development of particle accelerators for physics research and commercial applications, including electrostatic accelerators, linear accelerators (linacs) and cyclotrons. He and his wife recently started R&M Technical Enterprises, Inc., doing consulting work in the accelerator field based on these many years of experience. For 22 years, he was the President and CEO of AccSys Technology, Inc., a successful company devoted to the development and manufacturing of ion linear accelerators for medical, research and industrial applications. The company was bought by Hitachi Ltd. in 2007. Prior to co-founding AccSys in 1985, he was Manager of Research in the Radiation Division of Varian Associates, with primary responsibility for the development of new medical and industrial electron linacs. Robert was Vice President of R&D at The Cyclotron Corporation from 1981 to 1983, with responsibility for product development of commercial compact cyclotrons, and was acting head of the manufacturing group in 1983. Prior to that, he was a research staff physicist from 1977 to 1981 at the Los Alamos National Laboratory (LANL) in the Accelerator Technology Division where he participated in the National Cancer Institute program to develop a linac for cancer therapy and was a key member of the Radio Frequency Quadrupole (RFQ) proof-of-principle demonstration effort. Robert has over 80 publications in the scientific and engineering literature and has given numerous talks and colloquia worldwide. He has a BS in physics from the University of Southwestern Louisiana, an MS in physics from Florida State University and a PhD in accelerator physics from Texas A&M University. He has served on the Committee for Application in Physics within the American Physical Society and has worked as a visiting scientist in Dubna (JINR), Geneva (CERN) and Canada (Chalk River), and has worked in Saudi Arabia on a mission for the International Atomic Energy Agency.

Maps

If coming from Contra Costa County *via* the Caldecott Tunnel take the “Hwy 13 North, Berkeley” off ramp and follow the route shown here.

If coming from San Francisco take the “Claremont Ave” off ramp on Highway 24 and follow the route shown here. (College Avenue appears shorter, but is congested relative to the shown route in the early evening.)

From I-80 follow the route shown here.

Please disregard the running context, but this is a cool mapping application.

Here is a Lab map. The guard may give you a map and verbal directions, as well.