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E-CLOUD04 workshop (Napa, California, April 19-23, 2004)

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The 31st ICFA Advanced Beam Dynamics Workshop on Electron-Cloud Effects "E-CLOUD04" took place in Napa, California, during April 19-23, 2004. This workshop was co-sponsored by LBNL, CERN, ORNL and SNS, in addition to the ICFA Beam Dynamics Panel. The organization of the program was led by Bob Macek (LANL); the setting up and maintenance of the workshop website was (and still is) managed by Frank Zimmermann (CERN); supplemental funds for unanticipated business expenses were secured by Stuart Henderson (ORNL/SNS); the design of the poster was a collaboration between Mauro Pivi (SLAC) and Juliette Thomashausen (CERN); and the overall oversight of the organization, plus logistics and local arrangements, was led by Miguel Furman (LBNL).

There were 59 attendees from various institutions around the world. Most of the attendees gave presentations. The program was divided into several sessions: Observations at Existing Accelerators and Concerns for Future Machines; Surface Properties, Measurements and Treatments; Simulations of E-Cloud Buildup; Theory and Simulations of Electron-Cloud Instabilities; and Summaries. In addition, there was a Panel Discussion on Future Needs and Future Directions.

As in previous workshops dealing with electron-cloud effects (KEK, July 1997; Santa Fe, February 2000; KEK, September 2001; CERN, April 2002), the focus of this workshop was broad, covering all aspects of the phenomena. The work presented at E-CLOUD04 represented a significant advance relative to E-CLOUD02 (CERN, April 2002). The systematic experimental program being carried out at the SPS for many years now, in preparation for LHC operation, keeps yielding valuable information particularly concerning surface conditioning by the beam. Clear evidence for an electron-cloud effect at RHIC was presented, although direct detection of electrons in the cold regions remains to be achieved. With the clear establishment of electron-cloud effects at the PSR, other high-intensity hadron machines are studying the effect either experimentally or by simulations, or both. In particular, ORNL personnel are paying special attention to the phenomenon as the fabrication of the SNS storage ring vacuum chamber is being completed. Electron effects are being investigated at ISIS (RAL), and at the HCX experiment for heavy-ion fusion drivers (LBNL). On the simulation front, there has been significant progress towards extending simulation techniques to three dimensions, towards more realistic description of machine lattice elements, and towards self-consistency (in which both the beam and the electrons respond dynamically to each other). The electron-cloud community is thus enriched by the expertise brought in by researchers in intense hadron machines, which includes advanced computational techniques on parallel computers. The two B factories were reported to be running quite well, exceeding their design specifications on beam current and luminosity, after controlling the electron-cloud effect largely by means of weak solenoidal fields.

* Published as Sec. 5.2.1 of the ICFA Beam Dynamics Newsletter No. 33, July 2004, p. 215.

Ambitious plans for future luminosity upgrades were presented for both machines. Multi-lab collaborations were discussed and encouraged; one notable example of such a possibility would be a collaboration between the LARP project in the US and ESGARD in Europe.

In the opinion of many participants, the workshop was valuable and productive, helped define future lines of R&D in the area of electron-cloud effects, and incubated future collaborations. Besides the intense work and long hours of meetings, we had a most pleasant (optional) excursion and banquet in the wine country, which included the unveiling of a brand-new label, "Château Ecloud". A sample bottle, vintage 2004, will be allowed to age appropriately and will be consumed at a future similar meeting. The only disappointment was the inability of three invited participants to attend the workshop as a result of the new US requirements on visas or passports. In addition, a fourth participant declined our invitation citing the new procedures for entry into the US. Several organizers opined that it would be in the US's (and everybody else's) best interests to expedite the visa process for foreign scientists to attend meetings in the US, consistent with security concerns. The excessive delays we have seen in such a process is damaging to our mutual scientific enterprise.

Pursuant to the ICFA requirements for a "full workshop," proceedings are being published. All information on the workshop can be accessed from its home website, <http://www.cern.ch/icfa-ecloud04/>.

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