PHYSICAL REVIEW SPECIAL TOPICS - ACCELERATORS AND BEAMS
**11**, 120001 (2008)

# Essay: Robert H. Siemann—encounters and essays

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(Received 6 November 2008; published 1 December 2008)

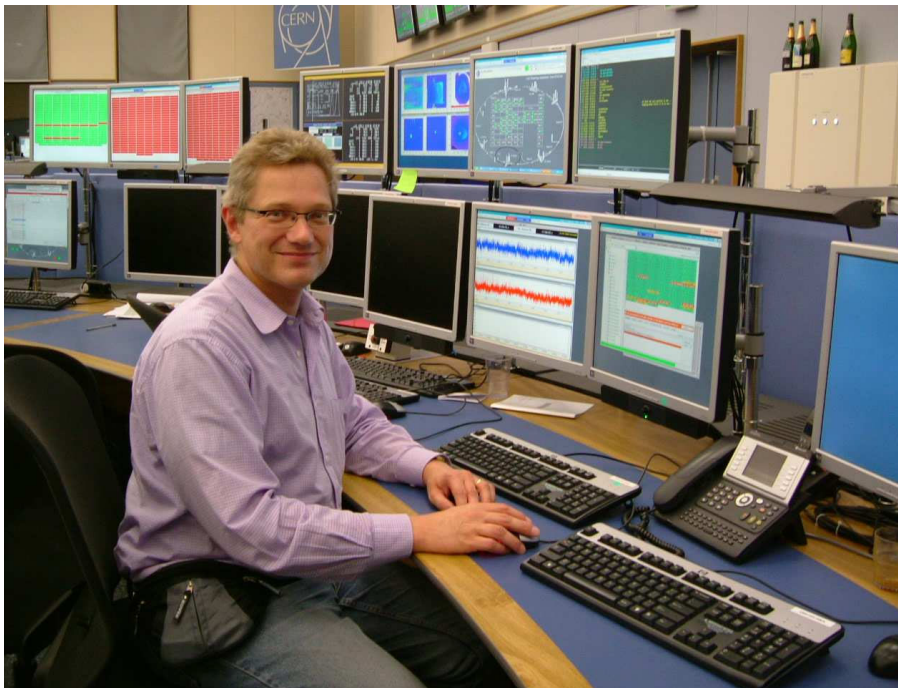
DOI: 10.1103/PhysRevSTAB.11.120001 PACS numbers: 01.60.+q, 29.20.db, 29.20.Ej, 29.27.−a

Sadly Professor Robert H. Siemann has passed away on 16 September 2008. For more than three decades he had been contributing to the progress and health of accelerator physics and technology—with numerous preeminent research contributions, via the training of an uncountable number of graduate students and postdoctorates, as skillful science manager and dedicated conference organizer, by chairing or serving in multiple advisory committees, and, last but not least, via his decisive role in establishing and leading *Physical Review Special Topics - Accelerators and Beams* as a timely, widely circulated, international, pioneering all-electronic, and open-access journal.

This is the first in a series of essays in memory of Robert ''Bob'' Siemann, which is published jointly in the December-2008 issues of the ICFA Beam Dynamics Newsletter and *PRST-AB*. The essays written by Bob's former students, colleagues, and friends review his remarkable career and life from many different angles. Their publication coincides with the 10-year anniversary of *PRST-AB*, the Editor of which Bob had been from the very start of the journal in 1998 through spring 2007.

## I. NUMEROUS ENCOUNTERS

Bob Siemann and his work are omnipresent in accelerator physics. In the years 1990–1991, when I was an accelerator-physics graduate student at the University of Hamburg in Germany,

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no week seemed to pass by without a new preprint from Bob and his student Srinivas Krishnagopal on display in the DESY library, presenting recent breakthroughs in the understanding of the beam-beam interaction and its correct modeling [1,2]. Later I learned that Bob, together with another Cornell student, Robert (Bob) Meller, had also been the first to study the shift of the coherent tune of two colliding beams with respect to the single-particle tune shift [3], which is now being referred to as the ''Yokoya factor'' after [4], but according to some veteran CERN colleagues could also be named the ''Meller-Siemann-Yokoya factor.'' Other important contributions of Bob concern the modeling of impedance-driven collective effects in storage rings and linear accelerators, and a clear and concise recipe for modeling synchrotron radiation effects in computer simulations [5]. Even nowadays, and as recently as two weeks ago, I am looking up his original papers whenever I plan to write such types of simulation.

Bob joined SLAC in 1991. In a recent article of *SLAC Today*, SLAC Director Emeritus Burton Richter recalls the circumstances of this transition and Bob's role in advancing accelerator science [6]: ''When we recruited Bob, he asked why accelerators, which were at the heart of the lab's activity, were not also part of its academic charter. He was a regular professor at Cornell and it was clear to me that he would not come here any other way... Bob not only brought us his vision of advanced accelerator science, but also a new charter that has been of great benefit to the lab ever since.''

After my own arrival at SLAC as a Research Associate in mid-1993, I was assigned half of a small cubicle just in front of Bob's office. In the evenings I often saw him working with great concentration while listening to opera music. I was deeply impressed by his friendliness, dedication, and practical spirit, which set him apart.

During my early period at SLAC, Bob was strongly involved with the SLAC Linear Collider (SLC). He and his team built various types of beam instrumentation for better diagnostics, performed measurements, wrote simulation codes, and developed novel theories. Bob provided a sovereign oversight for every kind of activity. Together with Torsten Limberg he proposed and implemented a successful upgrade of the two SLC damping rings, which allowed overcoming a longitudinal instability threshold and raising the beam intensity, and so the SLC luminosity.

After the successful completion of the SLC it had been planned to publish its story in a journal. Bob Siemann, dedicated as ever, was the first to complete drafts of the sections he was put in charge of, describing the damping rings and the positron system [7]; also I myself finished a draft chapter on the final focus [8]. Unfortunately, some other chapters were not completed, and the project was silently abandoned.

Over the years, Bob brought me into contact with many of the students, postdocs, staff, and professors working with him, in particular Michiko Minty, with whom I later taught several accelerator-physics courses and jointly published a textbook; Ralph W. Assmann, who now is a great colleague and friend at CERN; Mike Seidel, a wonderful physicist whom I already knew from DESY; Tong Chen who further advanced the art of beam-beam halo simulations and is also still in contact with me today; Boris Podobedov, presently at BNL performing an outstanding service as *PRST-AB* referee; Ping Chou who later returned to Taiwan; David H. Whittum, arguably the most gifted accelerator physicist whom I had the privilege to meet at SLAC; Eric Colby and Mark Hogan, who by the time I left SLAC were two bright newcomers in Bob's team; and Angie Seymour, his ever-caring departmental secretary.

In 1995 Bob Siemann took on the unthankful task of chairing the joint IEEE Particle Accelerator Conference and International High Energy Accelerator Conference, PAC'95, in Dallas. The place had been chosen while the Superconducting Super Collider had still been under construction, but in 1995 there was no longer any local laboratory to assist. As usual for him, Bob introduced a number of innovations. PAC'95 was to be the first accelerator conference with electronic proceedings, a feature which these days we are almost taking for granted, but which in 1995 posed formidable challenges. As there had been no experience, for many months after the conference I saw Bob aided by his wife spending the weekends at SLAC to reconcile

all the various types of format that had been submitted. They finally succeeded and the PAC'95 proceedings [9] proved remarkably successful. PAC proceedings and those of other accelerator conferences have been published electronically ever since, and can be retrieved free of charge from the JACoW Web site [10].

After the creation of his own department, SLAC ARDB, which was dedicated to advanced acceleration concepts, and though I was not a member, Bob often invited me to join ARDB social events, e.g., weekly BBQs and others, where many scientific and physics problems would be discussed in an informal exciting atmosphere. It was great fun. Today I am dearly missing these stimulating sources of inspiration, and I regret to know that they will never again be.

Fortunately Bob's spirit seems to be alive as ever. Last Friday I had a small meeting with a few colleagues at CERN, including a visitor from the U.S., to discuss beam-beam effects and the agenda of a planned workshop. At this occasion one of the participants, Jean-Pierre Koutchouk, recalled the summary talk delivered by Bob Siemann at the 1989 ICFA workshop on the beam-beam interaction in Novosibirsk [11], at the end of which he stated, in a pleasant comment, that some beam-beam computer simulation codes managed to reproduce the luminosity of the collider for which they were written, but that none of them was able to correctly predict the performance of any other accelerator. The audience reacted positively, and Bob's statement still rings true today. Without Bob's guidance and experience it will be even harder to ever achieve a reliable universal simulation code.

In 2003 Norbert Holtkamp and Bob Siemann invited me to join the Accelerator Systems Advisory Committee (ASAC) for the Spallation Neutron Source (SNS), a committee chaired by Bob. This gave me the opportunity to visit Tennessee a couple of times and there to meet Bob again, several years after I had left SLAC. Bob was as generous, cheerful, and kind as always and he was obviously happy to hear about my growing family in Geneva. His professional leadership of the ASAC committee helped to complete the SNS on time and on budget, while balancing the interests within a multilaboratory collaboration. For me it was a superb and unique experience, as well as an excellent preparation for my later service in several other similar committees.

Towards the end of my stay at SLAC in 1998, the new journal *PRST-AB* was launched [12]. I remember telling Bob my opinion that the journal better be free to authors, as otherwise it would be difficult for many of us to publish. Miraculously Bob found an ingenious and forward-looking way to make it free of charge for both authors and readers, based on sponsoring by the major American accelerator laboratories. Several years later, in 2005 I wrote an article for the *CERN Courier* about open-access publications and *PRST-AB* [13], which may have helped to convince CERN to become the first European sponsor of *PRST-AB* [14].

My most recent direct encounter with Bob also concerned the *PRST-AB* journal. Early in March 2007 I received an email from Bob: ''I would like to talk with you in the next few days. Would it be possible to arrange a call for early Monday or Tuesday morning California time.'' I had no idea what his message was about. In our subsequent phone conversation Bob informed me that due to a health problem he had to stop working for a while and he therefore wanted to step down as Editor of *PRST-AB*. He asked me if I was potentially interested in the *PRST-AB* editorship. Soon thereafter I was invited to a phone interview with the APS Editor-in-Chief Gene Sprouse and several of his colleagues, and a short while later Gene indeed offered me the Editor position. The CERN management turned out to be happy too. On 16 April I received another message from Bob, ''I was very pleased to hear from Gene Sprouse that you have accepted the *PRST-AB* editorship. It is a comfort to know that *PRST-AB* will be in good hands into the future, and I hope you get as much satisfaction from your editorship as I did from mine. I would like to be as much help as possible to make the transition smooth.'' And so he did!

Bob was a wonderful mentor for me as for many others. In much of my career I experienced his support and sympathy. It is an odd and unreal feeling that he should no longer be among us.

## II. MEMORIAL ESSAYS

The following series of essays covers multiple facets of Bob's career and work. It contains essays describing the state of high-energy physics during Bob's early years at Cornell, SLAC, and BNL; the instructive experiences of several summer and graduate students in particle physics and accelerator physics who completed their theses under Bob's supervision at Cornell or SLAC; Bob's contributions to the SLC; his launch of the ARDB department; Bob's involvement with advanced accelerator concepts, notably on laser and plasma accelerator schemes, including beam experiments at SLAC that demonstrated world-record acceleration levels; Bob's departmental leadership; his important role as chair of the SNS Accelerator Systems Advisory Committee, which has helped in completing this project on time and on budget; the launch of *PRST-AB*, the innovations introduced under Bob as its Editor, and the journal's astonishing success.

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