

Three Decades of Educating the Next Generation of Accelerator Scientists & Engineers

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Decades of in-depth involvement in training the next generation of scientists

- ❖ Deeply involved with the formal training of the next generation, since before either Susan or I knew him
- ❖ USPAS has had Alex's strong support for more than 30 years
- ❖ He has participated in every aspect of our endeavors
 - Co-Conspirator, organizing of new training programs
 - Advisor to the USPAS leadership
 - Member of USPAS committees
 - Member of the Board of Governors
 - Teacher of 216 graduate students
 - Writer of textbooks



He's been a guiding hand for the USPAS for over 35 years

- ❖ He was advising Mel Month before we were even called the “US Particle Accelerator School”
 - Back then, we were the “Summer School on High Energy Particle Accelerators”
 - “Mel and Alex were thick as thieves”

- ❖ With Mel he was a co-conspirator to launch the 1st Joint International Accelerator School in 1985
 - Important connection with the CERN School
 - In Sardina on the topic of the first school was Nonlinear Dynamics
 - Familiar faces of lecturers: Alex Chao, Ron Ruth, Karl Brown, Claudio Pellegrini, Jackson Laslett, John Seeman
 - Can you find them on the school photo
 - Alex’s lecture was “Resonances in Colliding Beams”



I can only recognize Ron Ruth & Glen Lambertson Can you do better?

<https://uspas.fnal.gov/programs/JAS/JAS85Photo.jpg>





Since the 1980's Alex has advised every USPAS Director

- ❖ He has do so both directly and by serving on committees
- ❖ He's been on Program (Curriculum) Committee since the beginning
 - “We tried many times to get rid of him, but he wouldn't go.”
 - This is another example of Alex's good sense & good advice!
- ❖ Alex has been on every kind of committee USPAS has ever had
 - Organizing & Steering Committee,
 - Board of Governors
 - Director's Advisory Committee
 - Curriculum (formerly Program) Committee
 - USPAS Prize Selection Committee



First encounters

- ❖ I first worked with Alex when I joined the USPAS Program Committee in 1996 at the urging of Bob Siemann
 - Alec has consistently advocated the rigorous academic style of USPAS
 - He has urged continuing commitment to basic courses for new people entering the field

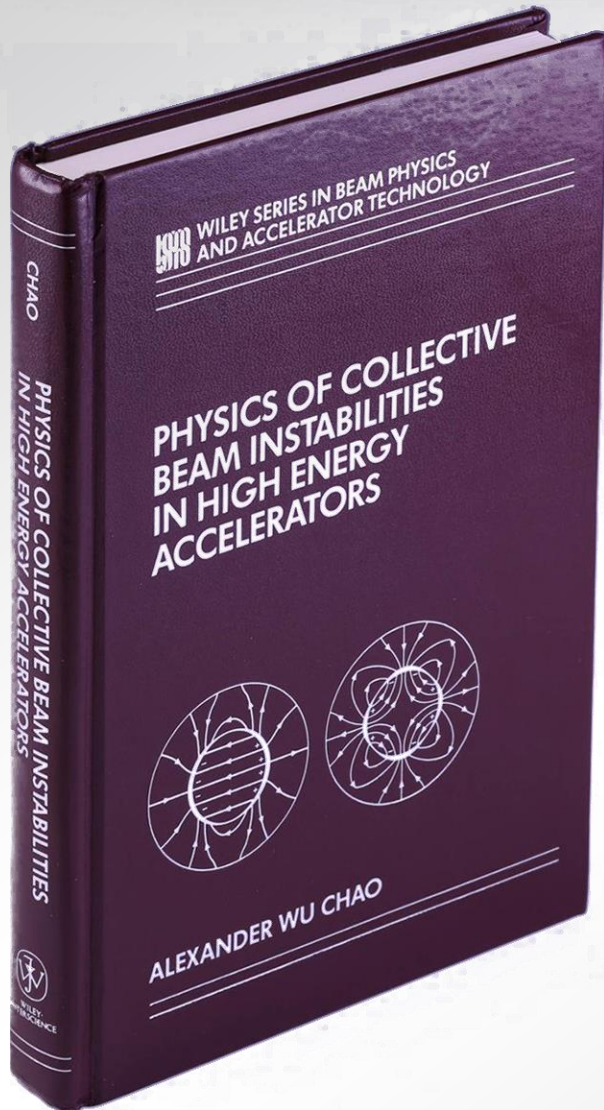
- ❖ An example of his approach is the curriculum for the 1st session (June 1987, University of Chicago)
 - High Energy Storage Rings, Richard Talman, Cornell University
 - Relativistic Electronics, Victor Granatstein, UMD
 - Particle Beams: Magnetic Optics, Karl Brown, SLAC
 - Particle Beams: Acceleration, Perry Wilson, SLAC



On the curriculum committee, Alex did more than suggesting work for others

- ❖ He has lectured in all 3 of our schools types
 - Symposium-style (The High Energy Physics Summer School)
 - The Joint International Schools
 - The now standard, rigorous, for-credit university-style sessions

- ❖ Alex has been a mainstay of our accelerator physics courses
 - He has taught 216 lucky USPAS students
 - In 4 graduate level introductions
 - My advice was always “If Alex Chao is teaching Accelerator Physics, take that course!”
 - In 9 advanced courses
 - My advice was “Learn from a master of the subject.”



- ❖ Alex is one of the few people who has been willing to teach this topic
- ❖ Advanced Accelerator Physics
 - Most recently in 2018W
 - Also 2000S, 1997S
- ❖ Collective Instabilities
 - with G. Stupakov in 2016S
 - Also 1992S, 1990 & 1989
- ❖ Special Topics in Accelerator Physics 2012S, 2009W
- ❖ Non-linear Physics
 - 1994W

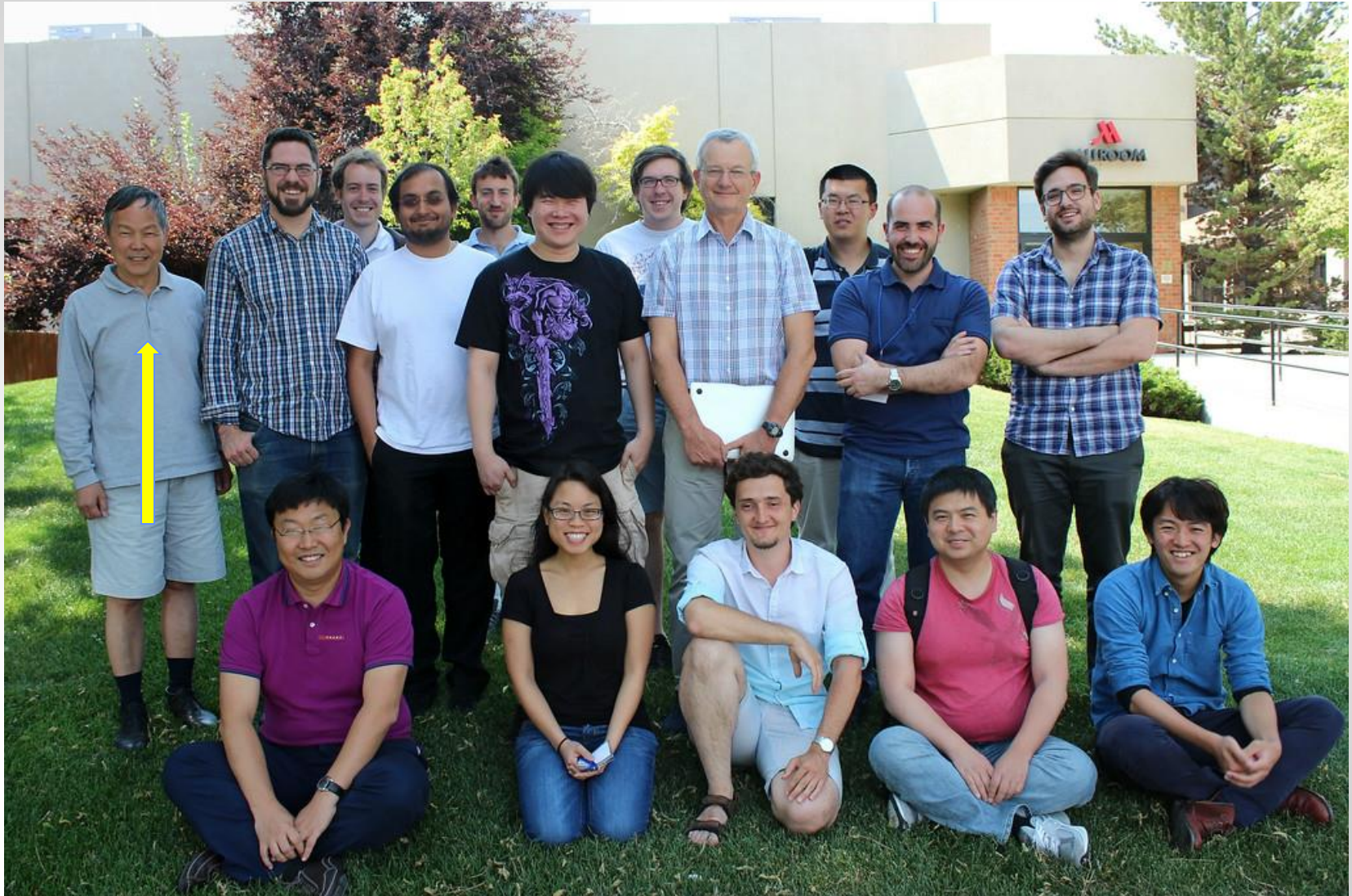


2018W – Advanced Accelerator Physics





2016S – Collective Instabilities



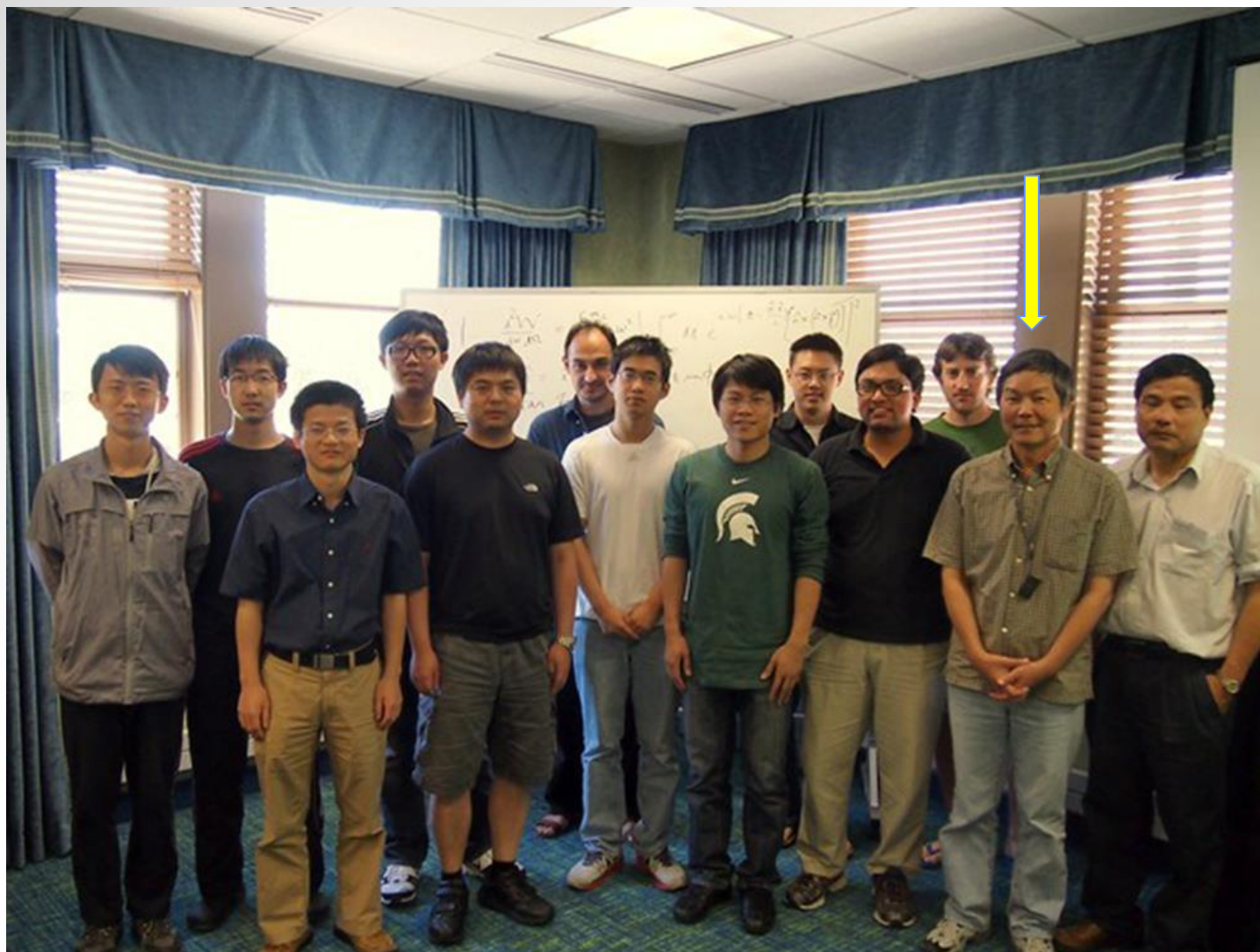


2015S – Special Topics





2012S – Special Topics





2009W – Special Topics



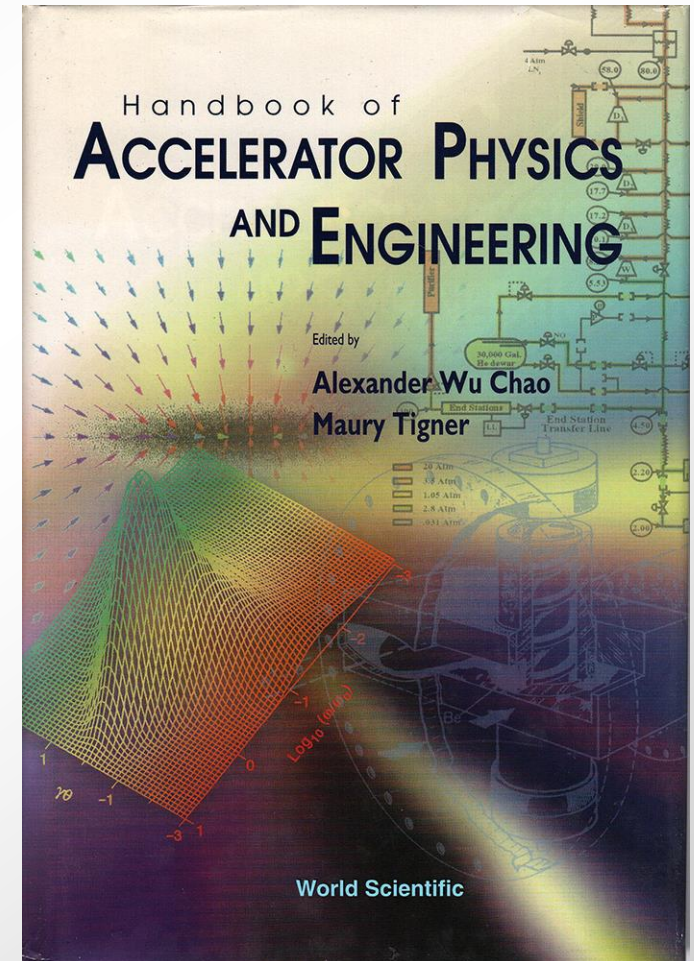
- ❖ In 2016 the USPAS presented Alex its “Iron Man” award
 - Recognizes his exceptional contributions in teaching at 13 USPAS academic sessions, not counting symposium & JAS lectures





Books are yet another of Alex's contribution to training the next generation

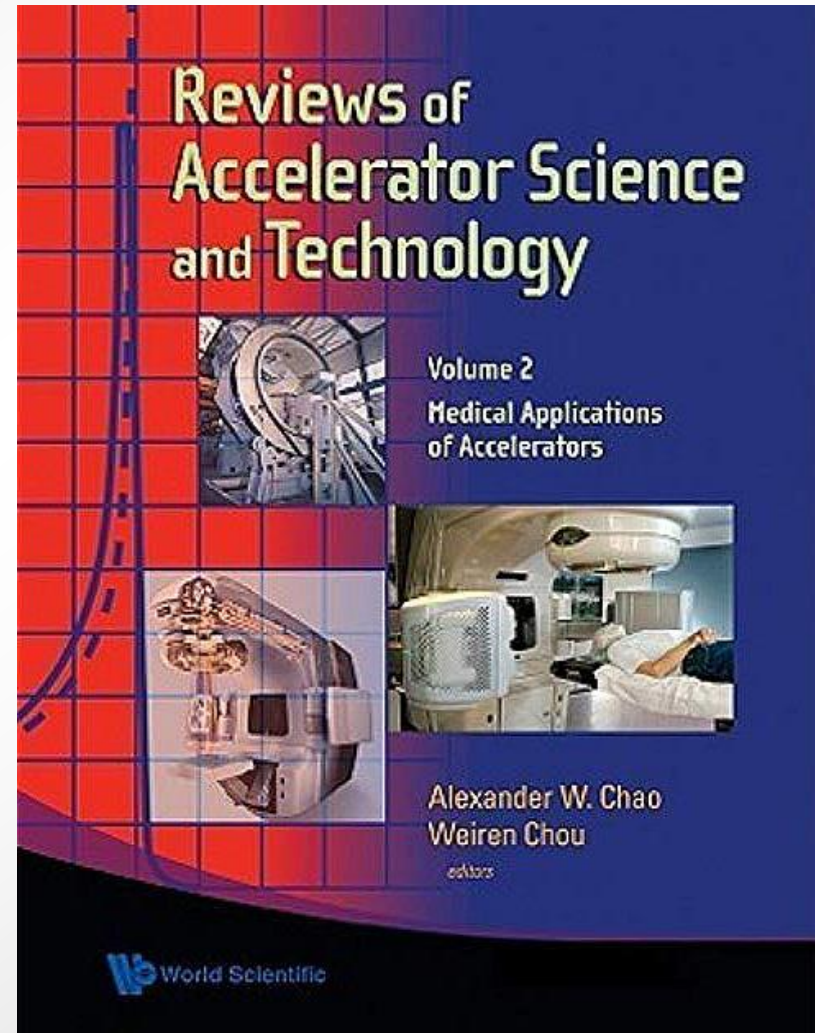
- ❖ Used as a comprehensive reference in many USPAS courses
- ❖ Alex and Maury have generously contributed their royalties to the USPAS every year
- ❖ A suggestion for the next edition: Change the name to “Harry Potter does Accelerator Physics & Engineering”





Although not meant as such, RAST has also been used as a textbook

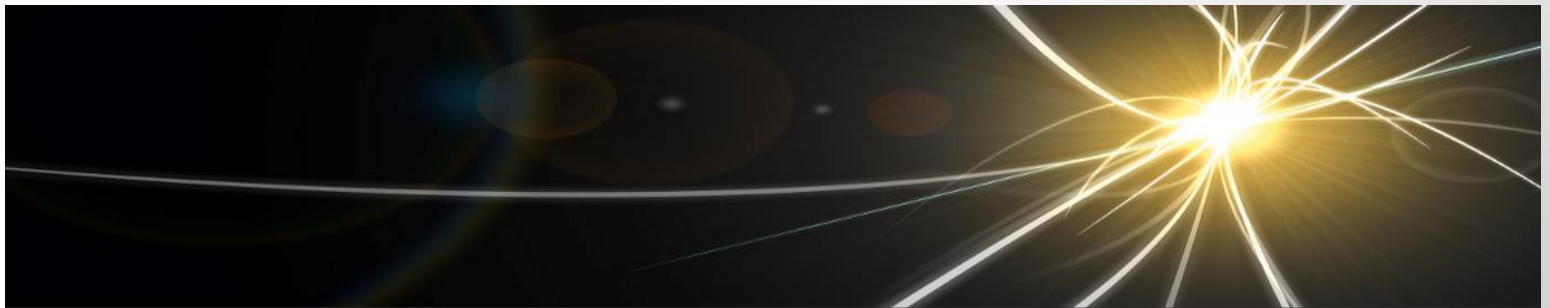
- ❖ Limited time (10 year) enterprise
 - Published annually
- ❖ Reported global efforts in education
 - Barletta, Chattopadhyay, & Seryi
- ❖ Vol. 2 (2009): "Medical Applications of Accelerators" can serve as a resource textbook
- ❖ Vol. 4 (2011): A useful resource for my course, "Industrial Applications of Accelerators."





The International Linear Collider School

- ❖ Throughout the history of the International Linear Collider School, Alex was a member of the Program Committee and the selection committee for students from the Americas
 - Together with Weiren Chou and myself, he looked for opportunities to bring students from Mexico & South America into the field of accelerator science and engineering
 - As the probabilities for the ILC began to fade, DOE/HEP & FNAL also withdrew its support for this school





Joining the Board of Governors

- ❖ In 2005 with Ewan Paterson's stepping down, Alex became the SLAC member of the BoG
- ❖ The hallmarks of his service were
 1. Full & active participation on the BoG
 - Continuing strong commitment to the USPAS “belonging to the community”
 2. Continuing service on the curriculum committee
 3. Support for new initiatives, social & academic
 4. Advocate for full funding of USPAS Office by DOE/HEP
 5. Always available to give prudent advice
 6. Broad perspectives of the impacts & potential of the USPAS
 7. Willingness to teach the “hard courses”



The USPAS Achievement Award (2017)

- ❖ For his insightful, *fundamental & broad-ranging* contributions to accelerator physics, ... for tireless community leadership and for inspiring and educating generations of accelerator physicists and engineers



- ❖ His reward: Serving on the next USPAS Prize Committee



**We wish Alex all the best in his
“retirement”**

**We thank him for his friendship &
and his constant support**

**Especially in the difficult
transition**

**after the OMB-mandated review
&
transition to new governance**