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American Nuclear Society
Trinity Section

DINNER MEETING ANNOUNCEMENT

"Radiation Belt Remediation"

Speaker: **Bruce Carlsten, PhD**, Laboratory Fellow, Engineering Sciences Directorate, Los Alamos National Laboratory

Abstract: please see next page.

Biography: please see next page.

Place: **Courtyard by Marriott, Santa Fe**
3347 Cerrillos Road, Santa Fe, NM (505-473-2800)

Directions: From Albuquerque, take I-25 North approximately 55 miles to Exit 278 (Cerrillos Road). Hotel is 3 miles from the exit on the left-hand side of Cerrillos Road at Richards Avenue.

Date: **September 29, 2017**

Time: **6:00** Social Hour with Cash Bar

7:00 Buffet Dinner (Chimichurri flank steak and grilled chicken Marsala)

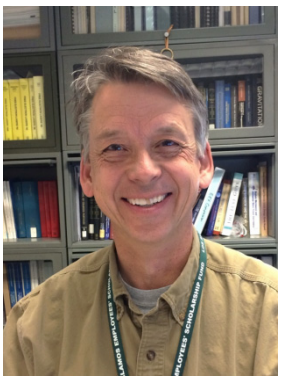
7:45 Speaker

Cost: *$35 per person (pre-paid by web sign-up in advance);*
$40 per person (not pre-paid, at the door);
$15 for students and children

We strongly encourage you to sign up and pay for this event by 25 Sep using the ANS Trinity PayPal payment account. Visit the "Calendar" page of our web site (http://local.ans.org/trinity/calendar.html) and select the appropriate payment button. You may use any credit card and do NOT need to have your own PayPal account to make the payment.

RSVP: If you do not use on-line payment, please RSVP no later than 25 Sep to:
Markku Koskelo: mkoskelo@aquilagroup.com (505-338-8083) or
Kimberly Klain: kclark@lanl.gov (505-665-1349)

RSVP must be received by 25 Sep in order to give final numbers to the caterers. While we strongly encourage everyone to use on-line payment to sign up and prepay, an RSVP is a commitment to attend/pay at the door. We cannot afford "no shows" after the final count is given to the caterers, as the Section is partially subsidizing the cost of this event. If you cancel after 25 Sep, you will still be responsible for paying.



Bruce Carlsten
Laboratory Fellow, R&D Engineer 6

Dr. Carlsten is an RF engineer and accelerator physicist. He joined the Laboratory in 1982 and since has worked on a variety of high-power RF source and accelerator projects. He led early research in high-power microwave devices (including high-frequency amplifiers) and in high-brightness electron beams. He was a pioneer in the development of RF photoinjectors and is credited with the discovery of the emittance compensation technique which has allowed photoinjectors to generate the exceptionally bright electron beams needed for the free-electron lasers (FELs) used as fourth-generation light sources. He designed, built, and commissioned two beam-physics research accelerators at Los Alamos (SPA and THOR). He led LANL's High-Power Electrodynamics Group from 2005 to 2012 and has since returned to research to focus on novel FEL technologies and synthetic aperture radar imaging schemes. Bruce is currently a member of the Advisory Board for the Air Force Office of Scientific Research MURI on Transformational Electromagnetics and a Member-at-Large of the Executive Committee of the IEEE Plasma Sciences and Applications Technical Committee. He has previously served on the joint DOE/NSF High Energy Physics Advisory Panel and as a Member-at-Large of the Executive Committees of the American Physical Society Division of Physics of Beams and the IEEE Technical Committee on Particle Accelerator Science and Technology.

Bruce is a Fellow of the IEEE, the American Physical Society, and the Los Alamos National Laboratory. He was awarded the 1999 US Particle Accelerator School Prize for Achievement in Accelerator Science and Technology and the 2017 Free-Electron Laser Prize. He also has six US Patent awards. He received a BS in Physics and a BA in Mathematics from UCLA in 1979, and an MS, Degree of Engineer, and PhD in Electrical Engineering from Stanford University in 1980, 1982, and 1985, respectively.

"Radiation Belt Remediation"

Abstract

Relativistic electrons can oscillate above the Earth trapped in the radiation belts (known as the Van Allen Belts). These electrons, which can originate from the solar wind or a high-altitude nuclear explosion, have the potential to damage satellites in low-Earth orbit. For example, in 1962, the US detonated the Starfire warhead at an altitude of about 400 km. The unexpected resulting enhancement of the radiation belts disabled several satellites within a few months and energetic electrons remained in the radiation belts for up to several years. In order to address this potential vulnerability, schemes have been proposed to drain electrons from the radiation belts, with the most promising based on using high-power radio waves to couple to the electrons. There is additional urgency to understand the underlying physics behind remediating these belts with recent geo-political events occurring on the Korean peninsula. This talk will provide an overview of the radiation belts and their electron distribution as well as approaches to radio-wave belt remediation. Importantly, significant power in orbit would be required for remediation, which might only be achievable with compact space nuclear reactors.