Stanford

Sami Gamal-Eldin Tantawi

Professor of Particle Physics and Astrophysics, Emeritus

SLAC General Program

Curriculum Vitae available Online

Bio

BIO

For over a decade I have advocated for dedicated research efforts on the basic physics of room temperature high gradient structures and new initiatives for the associated RF systems. This required demanding multidisciplinary collaboration to harness limited resources. The basic elements of the research needed to be inclusive to address not only the fundamentals of accelerator structures but also the fundamentals of associated technologies such as RF manipulation and novel microwave power sources. These basic research efforts were not bundled with specific developments for an application or a general program. The emerging technologies promise a broad, transformational impact.

With this underlying philosophy in mind, in 2006 the US High Gradient Research Collaboration for which I am the spokesman was formed. SLAC is the host of this collaboration, which comprises MIT, ANL, University of Maryland and University of Colorado, NRL and a host of SBIR companies. This led to the revitalization of this research area worldwide. The international collaborative effort grew to include KEK in Japan, INFN, Frascati in Italy, the Cockcroft Institute in the UK, and the CLIC team at CERN.

This effort led to a new understanding of the geometrical effects affecting high gradient operations. The collaborative work led to new advances in understanding the gradient limits of photonic band gap structures. Now we have a new optimization methodology for accelerator structure geometries and ongoing research on alternate and novel materials. These efforts doubled the usable gradient in normal conducting high gradient linacs to more than 100 MV/m, thus revitalizing the spread of the technology to other applications including compact Inverse Compton Scattering gamma-ray sources for national security applications, and compact proton linacs for cancer therapy.

ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, SLAC General Program
- Member, Stanford Cancer Institute

ADMINISTRATIVE APPOINTMENTS

- Chief Scientist, Accelerator Technology Research Division, SLAC National Accelerator laboratory, (2014-2021)
- Professor, Particle Physics and Astrophysics Department, (2012- present)
- Group Leader/Accelerator Technology Research Department Head, Stanford Linear Accelerator Center, (2006-2012)
- Associate Professor with Tenure, Physics and Astrophysics Department, (2005-2012)
- Associate Professor, Physics and Astrophysics Department, (2002-2005)
- High Power RF Group Leader., Stanford Linear Accelerator Center, Accelerator Research Department A, (1999-2006)

HONORS AND AWARDS

- Fellow, , American Physical Society (2005)
- Prize for achievements in accelerator physics and technology, US Particle Accelerator School (2003)

Publications

PUBLICATIONS

- **Status and future plans for C³ R&D** *JOURNAL OF INSTRUMENTATION*
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- **Frontiers in the Application of RF Vacuum Electronics** *IEEE TRANSACTIONS ON ELECTRON DEVICES*
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- **Monte Carlo simulation of shielding designs for a cabinet form factor preclinical MV-energy photon FLASH radiotherapy system.** *Medical physics*
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- **A “Cool” route to the Higgs boson and beyond. The Cool Copper Collider** *JINST - Journal of Instrumentation*
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