

Stefano De Santis

Staff Scientist
Lawrence Berkeley National Laboratory
ALS Accelerator Physics Group

Work experience

Present: Staff Scientist in the ALS Accelerator Physics Group. Technical Lead for the ALS Upgrade (ALS-U) beam diagnostics.

2008-2019: Staff Scientist in the LBNL Center for Beam Physics - Berkeley Accelerator Controls & Instrumentation program.

2000-2008: Scientist in the Beam Electrodynamics Group at LBNL.

1998-2000: Postdoctoral Fellow in the ALS Accelerator Physics Group.

1995-1997: Associate Research Fellow at the Frascati National Laboratory (INFN-LNF), Accelerators Division.

1994-1995: Associate Research Fellow at the Italian National Institute of Health (ISS), Physics Laboratory.

Career highlights

- Successfully led the beam diagnostics team for the ALS Upgrade Project (ALS-U) from the project very beginning through CD-2 approval.

 - Already passed final design review for the accumulator ring and one transfer line, and procurement and testing is already underway.

 - Covered most of the functions typical of a Cost Account Manager role for a 3.5 million dollar budget.

- Lead, or had a main role, in the design, testing, and commissioning of a number of electromagnetic structures, or diagnostic devices: - Swap-out kicker technology demonstrator (narrow-gap stripline kicker)

 - ALS longitudinal feedback kicker (damped cavity based design)

 - SPS wideband feedback kicker (wideband stripline kicker/beam pickup)

 - APEX stripline BPM (shorted stripline)

 - APEX removable Faraday cup (in collaboration with RadiaBeam Technologies)

 - Bunching cavities and BPM's for the Relativistic Klystron Two-beam Accelerator experiment (cavity BPM)

 - ALS third-harmonic cavity system

 - Tevatron abort gap monitor (MCP-PMT based detector)

 - HOM dampers for the DAFNE main RF cavities (waveguide based)

Within the ALS-U Project I also designed some devices, which have already passed final design review, or a close to do so. They are scheduled to enter fabrication

phase within the next 12 months:

- A variety of button BPM's fitting the various chamber geometries (including bench tests on prototypes and design of a test chamber on the ALS)
- A combined horizontal/vertical feedback kicker, designed to allow operation near the betatron linear coupling resonance
- High transfer impedance beam pickups for the ALS-U rings bunch charge monitor
- Synchrotron radiation diagnostic beamlines for both ALS-U rings
- Selection and integration of commercially available current, charge, and beam loss monitors.
- Injection/extraction kickers (both ferrite and stripline based)
- A stripline fast decoherence kicker for machine protection purposes

- Realized the first ever direct measurement of electron cloud in a storage ring, implementing a microwave transmission detection technique in the PEP-II LER.

Successfully implemented the technique also on CESR and DAFNE and expanded its theoretical understanding.

- Developed an analytical technique for the calculation of the beam impedance of series of small apertures in the vacuum chamber.

This technique was successfully used at CERN in the design of the LHC superconducting dipole liners to optimize the pumping hole distributions.

- Pioneered the study of transient beam loading in storage rings, their measurement, effects, and reduction/avoidance.

- Designed and operated an RF cell that allows microwave heating of a sample during X-ray tomography at the ALS.

Teaching experience

USPAS - Microwave Measurements and Beam Instrumentation Laboratory

Winter 2020

Summer 2016

Winter 2011

Summer 2003

Summer 2001

Winter 2000

UC Berkeley Extension

Post-Baccalaureate Health Professions Program

Physics and Physics Laboratory

2008-2010

Education

1998 Research Doctorate (Ph.D.) in Applied Electromagnetism
Universita degli Studi di Roma “La Sapienza”, Rome (Italy).

1993 Laurea (MS) in Electronics Engineering
Universita degli Studi di Roma “La Sapienza”, Rome (Italy).

Publications

More than 120 publications. Full list available on request.

Selected publications:

- “Advanced photon injector experiment commissioning results”, Phys. Rev. ST Accel. Beams 15 (2012) 103501

- “Measurements of electron cloud in large accelerators by microwave Dispersion”, Phys. Rev. Lett. 100 (2008) 094801

- “Commissioning of a higher harmonic RF system for the Advanced Light Source”, Nucl. Instr. Meth. A 455 (2000) 271-282

- “Interference effects on the coupling impedance of many holes in a coaxial beam pipe”, Phys. Rev. E 56 (1997) 5990-5995