



General information

SLAC National Accelerator Laboratory, Menlo Park, California, USA
 -Operated by Stanford University with a staff of roughly 1100 for the U.S. Department of Energy.
 -World's longest particle accelerator; opened in 1962.

Orbital particle detectors

Fermi Gamma-ray Space Telescope (FGST)

Large Area Telescope (LAT) scans entire gamma-ray sky ~16 times daily
 Gamma-ray Burst Monitor (GBM) locates and quantifies gamma-ray bursts

Underground particle detectors

Enriched Xenon Observatory (EXO-200)

200 kg of liquid Xenon-136 inside a time-projection chamber roughly 1 km underground at the Waste Isolation Pilot Plant in New Mexico, USA
 Search for neutrinoless double beta decay

Cryogenic Dark Matter Search (CDMS)

Disks of germanium and silicon, cooled to millikelvin temperatures by a dilution refrigerator
 Detection is done through superconducting transition edge sensors (TESs), SQUID amplifiers, and FET amplifiers
 Sets limits for WIMP/matter interactions

Light sources

Linac Coherent Light Source (LCLS)

Atomic, Molecular and Optical Science (AMO)
 Beam Line for Soft X-ray Science (SXR)
 X-ray Pump Probe (XPP)
 Coherent X-ray Imaging (CXI)
 X-ray Correlation Spectroscopy (XCS)
 The split and delay capability is still under commissioning for the XCS instrument.
 Matter in Extreme Conditions (MEC)

Stanford Synchrotron Radiation Laboratory (SSRL)

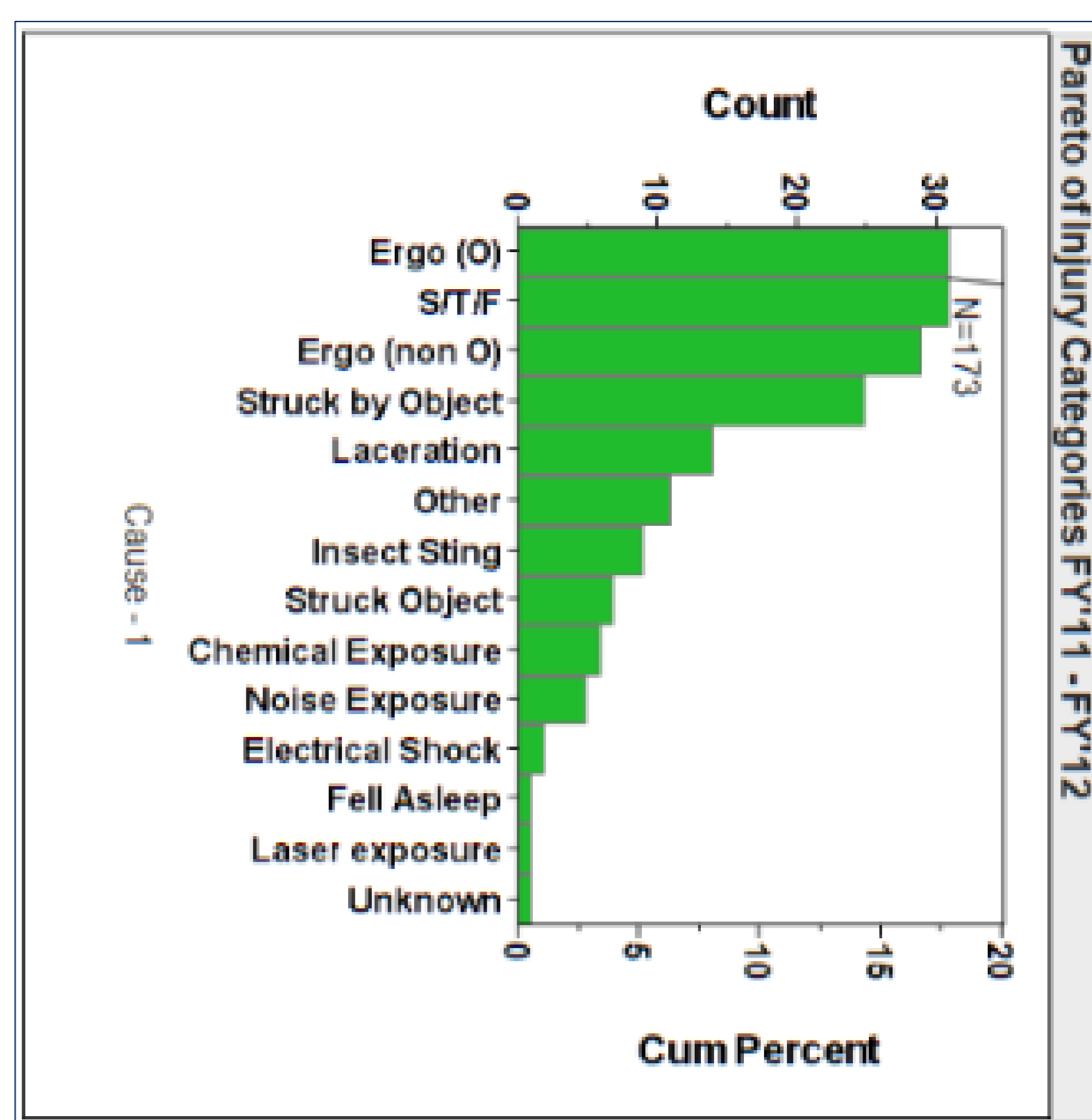
Small angle x-ray scattering
 Macromolecular crystallography
 Powder diffraction
 Thin film diffraction
 X-ray absorption spectroscopy imaging
 Macromolecular solution x-ray scattering
 Lipid membrane diffraction
 Fiber diffraction
 Time-resolved x-ray scattering/diffraction
 Small-angle single-crystal diffraction
 X-ray microscopy
 Crystallography
 Grazing incidence x-ray absorption spectroscopy
 Coherent soft x-ray scattering

Safety hazards

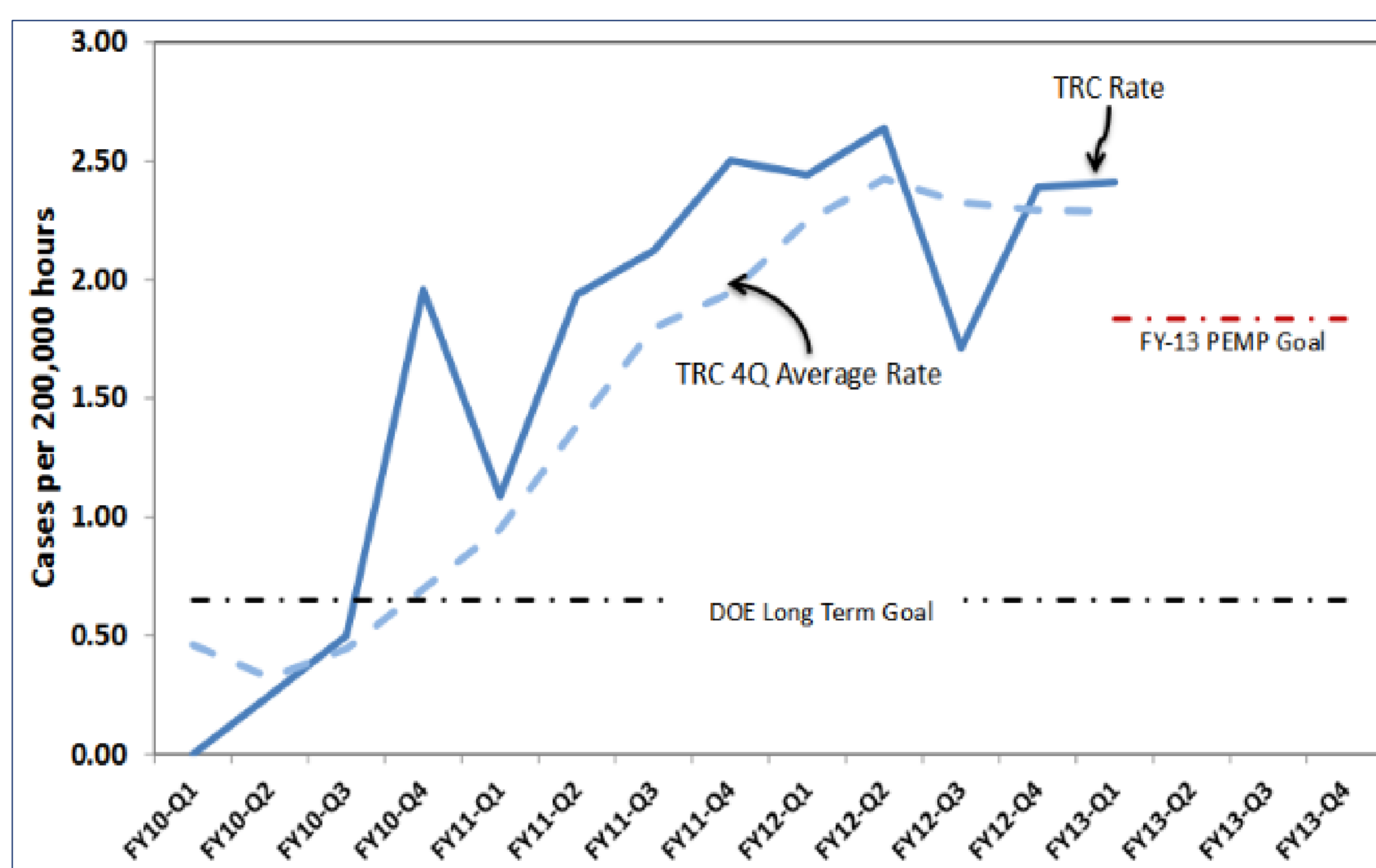
Safety concerns include: electrical (both high-current and high voltage), ionizing radiation, lasers, chemicals, biohazards, mechanical (hoisting and rigging), cryogenics, oxygen deficiency, fire, and high-pressure systems.
Environmental concerns include: airborne and waterborne releases, lead abatement, legacy soil contamination, hazardous and radioactive waste management, sustainability, and recycling.
 Though SLAC employs roughly 80 health and safety professionals to ensure regulatory compliance with dozens of government agencies, safety is part of every worker's job description.

Projects

- Beginning to construct another X-ray laser (LCLS-2)
- Building an electron test beam user facility (ESTB)
- Building the camera for a sky-survey optical telescope (LSST)
- Plans a second plasma-wakefield test accelerator (FACET-2)



SLAC's 2011 and 2012 injuries, by type



SLAC's Total Reportable (injury) Case rate

Test accelerators

Next Linear Collider Test Accelerator (NLCTA)

Echo-Enabled Harmonic Generation
 Tunable, narrowband THz
 Klystron reliability studies

Facility for Advanced Accelerator Experimental Testing (FACET)

Plasma- (lithium, cesium, and rubidium) and laser-wakefield electron acceleration
 Smith-Purcell effect studies
 Fast magnetic switching studies

