Los Alamos's secret-keeper.

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Research Highlights . . .

DOE Pulse

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Catching some solar wind

One of three instruments designed and built for NASA's Genesis space mission began capturing some of the sun recently. Genesis recently went into orbit around the Lagrange 1 point, a spot nearly one million miles from Earth where the gravities of the Earth and sun are in balance. Genesis will remain at Lagrange 1 for roughly two and a half years while the DOE–Los Alamos instruments take data with solar wind ion and electron monitors. Before returning to Earth, a instrument will take samples of the solar wind that may help scientists better understand the origin of the solar system.

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High-temp superconductor's "kink-iness" revealed

A study at the Advanced Light Source of DOE's Lawrence Berkeley National Laboratory has revealed that, contrary to what many scientists have argued, the physics behind the high-temperature superconductivity of copper oxides may be every bit as "kinky" as that behind their low-temperature metal counterparts. Stanford physicist Zhi-Xun led an international collaboration that identified a kink in the energy spectrum of low-energy electrons in three different families of copper oxide superconductors. This spectral kink is the signature of an interaction or "coupling" between an electron and a phonon, a vibration in the ions that form the lattice of a superconductor's crystal. Electron-phonon coupling is behind the low-temperature superconductivity of metal alloys.

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Team studies waste incineration options

A program managed at the DOE's Idaho National Engineering and Environmental Laboratory is evaluating a technology for treating certain waste streams without using incineration. The Transuranic and Mixed Waste Focus Area, sponsored by the DOE Office of Science and Technology, has chosen Virginia-based AEA Technology Engineering Service's "Silver II" method for further testing. The process chemically oxidizes molecules and operates at low temperatures, is easy to control, treats most organic wastes, reduces waste volume and produces no dioxins or low-emission volumes containing polyaromatic hydrocarbons. If the technology is successful in tests using surrogate mixed waste, the process will likely be tested and possibly used for several difficult waste streams. water and oil.

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Virtual guide star shines

Scientists at DOE's Lawrence Livermore National Laboratory, in collaboration with the W.M. Keck Observatory, have created a "virtual" guide star over Hawaii. The "virtual" guide star, which achieved "first light" on Dec. 23, 2001, will be used with adaptive optics on the Keck II telescope to greatly increase the resolution of fine details of astronomical objects. The Keck adaptive optics system has enabled astronomers to minimize the blurring effects of the Earth's atmosphere, producing images with unprecedented detail and resolution. The adaptive optics system uses light from a relatively bright star to measure the atmospheric distortions and to correct for them.

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DOE Pulse highlights work being done at the Department of Energy's national laboratories. DOE's laboratories house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security and environmental quality missions. ***DOE Pulse*** (www.ornl.gov/news/pulse/) is distributed every two weeks. For more information, please contact Jeff Sherwood (jeff.sherwood@hq.doe.gov, 202-586-5806).