research and technology development. We are essentially doing technology development, so the shift in priorities might even help us."

Chen added that HTS maglev bearings were a powerful educational tool: "It turns out that HTS maglev bearings, as would be employed on lunar telescopes, are an extremely powerful educational tool. I have demonstrated the bearings to school kids and have had students raise their hands and say: 'Wow! That's real cool! Where do I sign up for the physics course?'

"HTS bearings are something that are really out of most people's experience. You see special effects on TV, but in real life seeing something that is actually floating in the air is rare. This is an extremely useful tool for getting youngsters interested in science and the concept that physics can be fun." ❍

NIST Researcher Develops Thinner, More Flexible HTS Cable

A University of Colorado (UC) researcher working at the National Institute of Standards and Technology (NIST) has reportedly developed a method for making HTS cables that are thinner and more flexible than demonstration cables currently used in the electric power grid while carrying the same or more current. The light weight, thinness, and flexibility of the cables may lead to uses in electricity distribution, scientific and medical equipment, and military applications.

"The cabling concept is a direct result of the expertise I gained from my work within the NIST program, which was funded in part by the DOE's Office of Electricity Delivery and Energy Reliability," said the UC Researcher who developed the cables, Danko van der Laan. "Although the concept was fully developed at NIST, we are collaborating with others, including Oak Ridge National Lab and the Air Force Research Lab."

GdBCO has Increased Tolerance to Strain

The new cables are created by winding multiple HTS gadolinium barium cuprate (GdBCO) tapes in spirals in alternating directions around a multi-strand copper 'former,' or core. The primary innovation is the use of an HTS compound that is more tolerable to compressive strain than other materials, thereby allowing for the use of an unusually slender copper former.

"The main innovation is that YBCO and GdBCO coated conductors are not mechanically damaged up to compressive strains of about -1%," explained van der Laan. "This allows for the small diameter former. The reversible change in I_c with strain that occurs even at low strains is much lower for GdBCO than it is for YBCO.

"We didn't realize this until we obtained a new batch of what we thought were YBCO coated conductors and measured the strain dependence of the I_c. Because we measured a much different behavior than expected, we asked the company how this batch differed from a previous batch we had obtained from them. That's when we discovered the material was GdBCO."

GdBCO Price is an Obstacle

The cables would be sufficiently small, lightweight, and flexible to pull transmission lines through conduits with tight bends. They could be used for transformers, generators, superconducting magnetic energy storage (SMES) devices that require high-current windings, and high-field magnets for fusion and proton beam radiation therapy systems.

"There are a lot of benefits from flexible, lightweight cables regarding cost," noted van der Laan. "These cables require less space to install, and thus allow for a higher current capacity to be installed in an existing conduit.

"The flexibility and weight make it easier to install the cables and allow for longer cable lengths on the same cable spool. A longer cable length means fewer splices that need to be prepared during cable installation.

"This cabling concept is relatively easy to scale-up using conventional cabling machines. However, one of the biggest obstacles to industrial production remains the availability and price of GdBCO."

Prototypes are Smaller and Carry Higher Loads than Cables in Use

Van der Laan initially developed two prototype cables. One is 6.5 mm wide and can carry a current of 1,200 A. The second is 7.5 mm wide and can carry a current of 2,800 A. In comparison, a cable installed at a utility substation in Columbus, Ohio, is 7 cm wide and can carry 3,000 A per phase.

"We have finished testing a new, 10 mm diameter cable, at 4800 A," van der Laan said. "This cable is being developed for the Air Force and designed to carry over 7500 A at 76 K, but our test facility is currently limited to 4800 A.

"The current cable is most suitable for direct current (DC) power transmission on aircraft and ships. We're planning to adjust the concept to make the cable suitable for alternating current (AC) power transmission as well."

"One of the main areas for which the cable concept will be developed, beside military power transmission, is high-field magnets and possibly SMES. These applications require high-current density cables that need to withstand large forces during operation. The cable concept has to be adjusted to meet these requirements."

New Company to Commercialize GdBCO Cable

Van der Laan is starting a company to commercialize the cable for different applications. The company, Advanced Conductor Technologies, has a website at: www.advancedconductor.com.

"We are planning to develop the cable for various applications besides DC power transmission," van der Laan noted. "We are going to adjust the design to optimize it for AC power transmission by improving the current distribution in the cable. Future cable development will likely include new collaborations with other research institutes, universities and companies, such as with the National High Magnetic Field Lab in Tallahassee, Florida."
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BEST Hires Masur as VP of Business Development

Bruker Energy & Supercon Technologies, Inc. (BEST) has announced the appointment of Larry Masur as VP of Business Development, North America. Masur will be based in Billerica, MA, and be responsible for business development activities in North America, as well as supporting business development initiatives in the Asia-Pacific region.

For the past three and a half years, Masur was VP of Business Development at Zenergy Power Inc. Zenergy recently released that it would no longer pursue the development of superconducting fault current limiters (SFCL) following a prolonged decline in the company's share prices (see *Superconductor Week*, Vol 25, No 5). Maser stated that SFCL development was one of the programs he was looking forward to being involved in with BEST: "I look forward to playing a role in developing our sales channels, identifying new markets for BEST's existing line of LTS wire and device products, and commercializing the new products that BEST is developing, particularly crystal growth magnets and SFCLs." ❍

U Tokyo Claims Massive Pacific Ocean Rare Earth Find

Researchers with the University of Tokyo and the Japan Agency for Marine-Earth Science and