LSU professors develop 'superconducting microfibers' that could advance space travel

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LSU Assistant Professor David Young and Professors Phil Adams and Roy Goodrich have found a way to **synthesize a layer of superconductor directly onto tiny carbon fibers** that are five times smaller than a human hair, and the results could lead to advances in space travel and transport.

Young and his colleagues in the Department of Physics and Astronomy have attracted attention and funding from the Army Space and Missile Defense Command's Education and Employment for Technology Excellence in Aviation, Missiles and Space, or EETEAMS. Through this program, which provides research grants to colleges and universities, the LSU physicists will receive almost $200,000 during the next 12 months.

According to Young, their research attracted the program's attention because the wires can be wound into a coil to create a large magnetic field.

"If we can make a new magnet that does the same job as a conventional one, they are very interested," he said. "In space travel, magnets could be used to confine plasma for power generation. Magnets can also be used to expel plasma as a means of propulsion, so the theory is that they could be used to 'drive' spacecrafts."

He explained that the magnets made out of the tiny wire are mostly carbon, and thus very lightweight and easy to get into orbit, while heavier items – such as normal high-power magnets – are much more

expensive to send into space.

Young said that the superconductivity of the wires might offer other financial benefits as well.

"Because it is a superconductor, there is no loss of electricity," he said. "Therefore, once a current is flowing in a magnet, it doesn't cost you anything to keep it there."

A superconductor, Young explained, is a material that, when cooled below some characteristic temperature, can transport an electric current without any loss of energy. In other words, he says, it has no electrical resistance.

Young said that he and his colleagues have succeeded in synthesizing a layer of superconductor on a wire made of a magnesium carbon nickel compound. However, this wire does not function at an ideal temperature for deep space applications. The next step, he said, is to synthesize a wire using a magnesium boron compound that will function at the appropriate temperatures.

Should they succeed, Young said that there will likely be more funding to follow and they will then attempt to build a prototype magnet. Such a prototype would not only be of interest to the Army, he said, but possibly NASA and other agencies involved in space research and exploration.

Source: Louisiana State University