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Using unconventional wisdom to halt blackouts

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A wayward driver hits a light pole. The pole falls on a conductor. The lights go out.

It happens, and very recently happened in Oak Ridge, plunging the east side of town into darkness for over 12 hours.

Why did the electricity shut down? Because protective relays and breakers are designed to open and cut current to keep from destroying the lines.

That's the conventional wisdom. Superconductivity would provide an unconventional way to change the scenario, say Oak Ridge researchers.

"There's no conventional counterpart to this, this would be a new application," Mike Gouge, group leader of superconductivity at Oak Ridge National Laboratory, said of the superconducting "fault current limiter."

When things go wrong, fault currents juice the system from 10 to 30 times the normal current. The fault current limiter could reduce that to only about two to six times normal current, said Gouge.

The fault current limiter would be made of superconducting tube, which when cold, has almost no resistance.

"It's almost invisible to the system," said Gouge.

"If you get a fault current through there due to a squirrel or a tree, all of a sudden you go above the critical current. Well, because it's superconductive tubing, you start losing that superconductivity - so resistance increases and limits the peak fault current," he said. "That's a big deal to utilities in that it saves them money, and it's a technology that doesn't exist conventionally right now."

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The lab is working on high voltage design and cooling technique to assist SuperPower Inc. in New York on development of the fault current limiter.

The Department of Energy last week pumped a \$6 million grant to SuperPower for the technology in hopes of limiting damage to the power grid during power surges. In July, DOE announced a \$13 million grant for SuperPower's superconductor cable demonstration project.

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