Japan demo shows electricity entering EV through tires

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(Phys.org) -- Electric vehicles' future continues to tease scientists to devise promising and practical ideas to keep these cars moving along the highways without having to pull over and wait for a battery recharge. Solutions for the so called “charging and range problem” took yet another twist this month when a Japanese university team demonstrated

how electricity can be transmitted to a pair of tires through a four-inch-thick block of concrete, the type of concrete used on roads. The team took its demo to WTP (Wireless Technology Park) 2012, a trade show on wireless technologies, earlier this month in Yokohama.

Their solution is in the form of a wireless power prototype that can successfully transmit electricity through the concrete block. They consider the prototype as an early step to improve on, and that such an approach can be used one day to keep electric vehicles on the move.

Takashi Ohira, an electrical engineering professor at the Toyohashi University of Technology, who leads the team, has developed his electric field coupling system to supply a charge to a car through its tires. The goal is to enable power transmission as the vehicle's tires travel along the road with suitable efficiency and power transfers.

In the demo, a metal plate was placed along with a four-inch layer of concrete, representing the road surface. Electricity between 50 and 60 watts was transmitted to actual-size automobile tires. The demo also showed a light bulb, attached between the two demo car tires, turning on.

The university team's project is called EVER (Electric Vehicle on Electrified Roadway). The focus is research aimed at using wireless power transmission technologies based on electric field coupling for transmitting power to a running vehicle.

The July demo is the latest of similar past efforts by the researchers. Last year, Toyota Central R&D Labs and Ohira reported on their work to allow electric cars to drive unlimited distances on an electrified roadway. They reported a system that similarly transmits electric power through steel belts inside the two tires and a metal plate in the road. They presented their work at a workshop in Kyoto. To test how much energy would be lost as electricity traveled through the tire rubber, the

researchers also set up a lab experiment with metal plates. "Less than 20 percent of the transmitted power is dissipated in the circuit," said Ohira at that time. With enough power the system could run typical passenger cars, he added.

To make their present technology useful, the electric power needs to be increased by 100 times. But, moving ahead, the group said that they are up to the task of meeting the project's challenges.

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