Omnidirectional Light Absorber and Concentrator

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- Electrical Engineering
- Green Technology

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- Solar
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While the theoretical concept of "black body" radiation has proved remarkably useful for modern science and engineering, from its role in the creation of quantum mechanics to its applications for actual light sources, few materials or structures come close to 100 percent absorption for all angles over a broad bandwidth. Obviously, the greater the amount of energy a solar cell can absorb, the greater the amount of energy that can be harvested and converted to electricity. Materials commonly used in solar panels approach perfect absorbance, but their full absorbance can only be realized when light strikes the panel at a particular angle. As a result, panels must constantly move with the sun in order to maximize their potential.

Researchers at Purdue University have developed an omnidirectional electromagnetic wave concentrator and absorber with nearly perfect absorption for essentially all angles over a broad bandwidth. This electromagnetic "black hole" absorbs a wide spectrum of electromagnetic energy with extremely high efficiency regardless of the direction the light comes from. Solar panels incorporating this technology would not need to constantly reorient toward the sun. The novel properties of this technology make it valuable in other applications as well, including thermal light emitters and optoelectronic components. The relative simplicity of implementation makes this a viable commercial option for next generation solar energy collection and improved optical technologies.

Advantages:
-High efficiency at all angles of orientation
-Absorbance of broad bandwidth
-Simple design

Potential Applications:

-Solar industry
-Solar panel manufacturers
-Thermal light emitters
-Optoelectronic components

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Intellectual Property:

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