Scientists use 'funnel-vision' to pioneer cheap and efficient solar energy

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Scientists have developed a pioneering new technique that could unlock new methods of making solar energy more efficient.

A team of experts from the University of Exeter has discovered an innovative way for generating photovoltaic (PV) energy – or ways in which to convert light into power.

The new technique relies on 'funnelling' the sun's energy more efficiently directly into power cells, such as solar panels or batteries.

Crucially, this ground-breaking method has the potential to harvest three times the energy compared with traditional systems. The researchers believe their breakthrough could result in solar panels, no bigger than a book, producing enough energy to power a family-sized house.

The results are published in *Nature Communications*.

Adolfo De Sanctis, lead author of the paper and from the University of Exeter said: "The idea is similar to pouring a liquid into a container, as we all know it is much more efficient if we use a funnel. However, such charge funnels cannot be realised with conventional semiconductors and only the recent discovery of atomically thin materials has enabled this discovery."

In the research, the team of physics experts developed how to 'funnel' electrical charge onto a chip. Using the atomically thin semiconductor hafnium disulphide (HfS2), which is oxidized with a high-intensity UV laser, the team were able to engineer an electric field that funnels electrical charges to a specific area of the chip, where they can be more easily extracted.

While current solar cells are able to convert into electricity around 20 per cent of the energy received from the Sun, the new technique has the potential to convert around 60 per cent of it by funnelling the energy more efficiently.

"Strain-engineered inverse charge-funnelling in layered semiconductors" is published in *Nature Communications*.

More information: Adolfo De Sanctis et al. Strain-engineered inverse

charge-funnelling in layered semiconductors, *Nature Communications* (2018). DOI: 10.1038/s41467-018-04099-7

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