



# A Shade Tolerant Panel Design for Thin Film Photovoltaics

**A novel radial solar panel layout simplifies manufacturing and eliminates external bypass diodes, enhancing cell reliability and mitigating shadow-induced degradation and fire risk.**

Solar cells are becoming increasingly efficient at converting light into electricity, but there are still some reliability issues, such as when a solar panel cell is shaded, it will shut down and start absorbing excessive energy from the connected cells. This excess energy causes heating in the cell, which can damage the cell or even start a fire. This problem has usually been addressed by connecting diodes between segments of cells to prevent the current from flowing into a shaded panel section; however, this solution does not work unless a large area is shaded.

Researchers at Purdue University have developed a new solution to this problem by designing a radial layout for a solar panel. This design assures that a shadow will shade many cells at once, allowing the reverse voltage to distribute across the shaded cells. This design avoids reverse breakdown without the need for external bypass diodes, thereby, simplifying the manufacturing process and alleviating shadow degradation.

## **Advantages:**

- Increased reliability of cells
- Less risk of damage

## **Potential Applications:**

- Solar industry
- Solar panel manufacturers

**TRL: 5**

## **Intellectual Property:**

## **Technology ID**

66109

## **Category**

Semiconductors/Devices &  
Components  
Energy & Power Systems/Power  
Generation  
Materials Science &  
Nanotechnology/Thermal  
Management Materials &  
Solutions

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