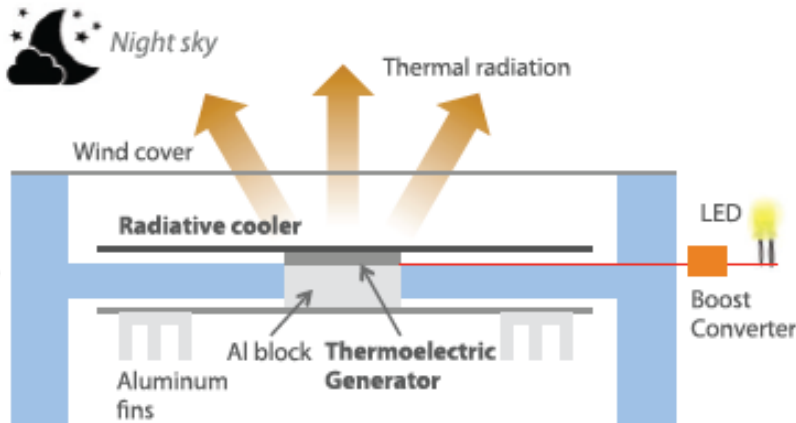


# Generating Light from Darkness



Work was performed at Stanford

## Scientific Achievement

We demonstrate renewable power generation at night by harnessing the cold darkness of space, using radiative cooling and thermoelectrics.

## Significance and Impact

Our results highlight the space as an abundant renewable energy resource. Night-time power generation of  $25 \text{ mW/m}^2$  is demonstrated, sufficient for a LED. Pathways to performance  $> 0.5 \text{ W/m}^2$  using existing commodity components exist. This approach is immediately practical for lighting and off-grid sensors.

## Research Details

- Radiative cooling produces a temperature that's several degrees below ambient.
- A thermoelectric generator is built to couple the cold radiative cooler and the warm ambient air. The temperature difference is used to produce power generation of  $25 \text{ mW/m}^2$ , sufficient for a LED

A. Raman, W. Li, and S. Fan, *Joule* **3**, 2679-2686 (2019)

