What is the technology?

- Dual-junction III-V solar cell designed for efficiency >25% (400 °C, 500-suns)
- Cell structure, dopants, coatings and metallization developed for long-term high temp. performance.
- Epitaxial lift-off reduces cell cost.
- Accelerated lifetime testing (elevated temperature and thermal cycling) to design for 25-yr lifetime.
Why the technology is exciting and potentially transformational:

- No prior demonstration of solar cell with long-term operation at 400 °C.
- Enabling technology for very high efficiency hybrid systems.

Areas that require invention to achieve project objectives and/or address risks:

- Tech-to-market: development of hybrid technology for cell insertion.

**How does it improve the state-of-the-art?**

<table>
<thead>
<tr>
<th>Metric</th>
<th>State of the Art</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell efficiency (400 °C, AM1.5D 500x)</td>
<td>Not established</td>
<td>25%</td>
</tr>
<tr>
<td>Field lifetime (400 °C, AM1.5D 500x)</td>
<td>Not established</td>
<td>25 years</td>
</tr>
<tr>
<td>High volume cell manufacturing cost (AM1.5D 500x)</td>
<td>$0.40/W</td>
<td>$0.15/W</td>
</tr>
</tbody>
</table>
**Status and achievements** of the project to date

- Demonstrated single-junction GaAs solar cell operating at 400 °C with open-circuit voltage > 400 mV (500-suns).
- Determined thermally-stable dopants for use in single-junction GaAs cell and tunnel junction design.
- Demonstrated dielectric protection of window layer.
Challenges that the team has encountered

- Demonstration of top metal with long-term stability.