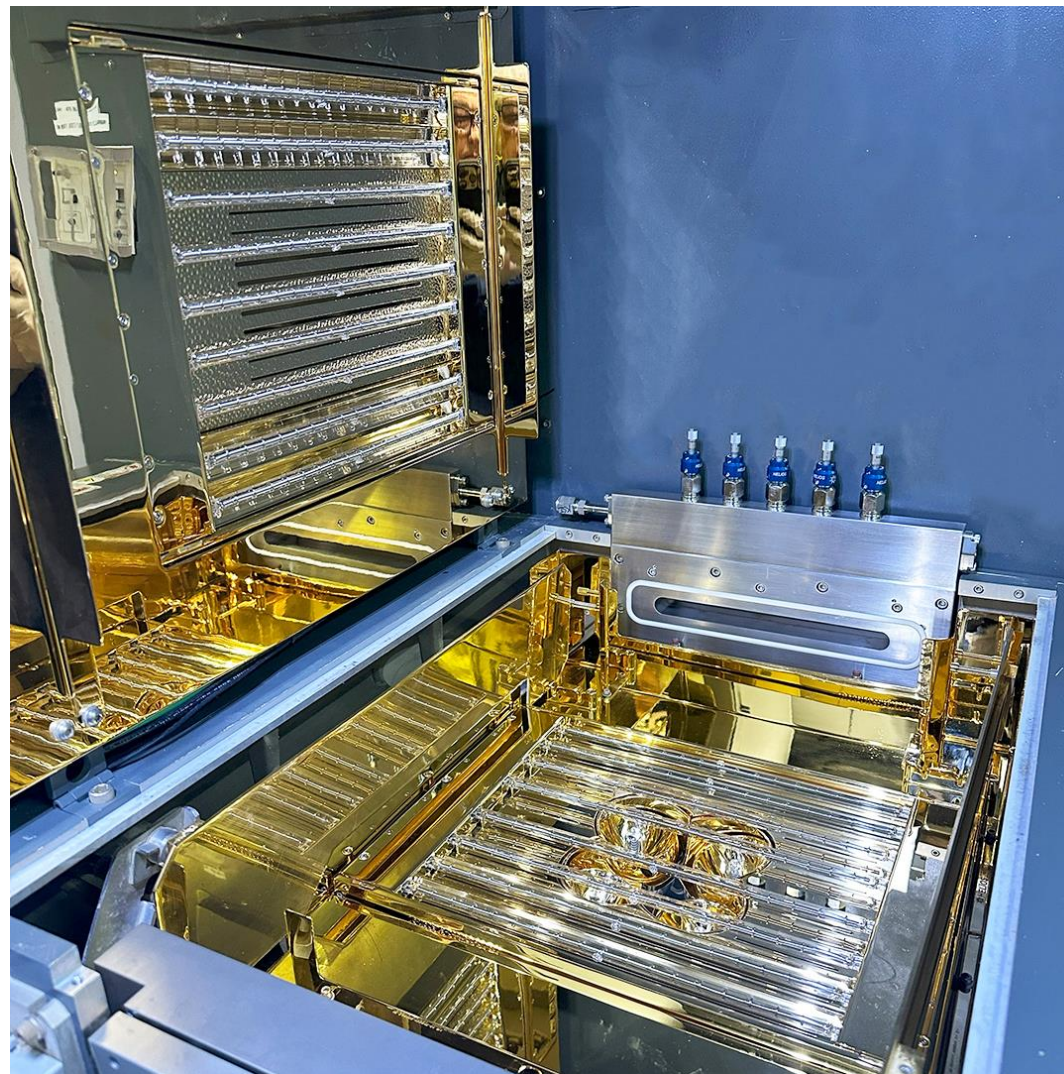


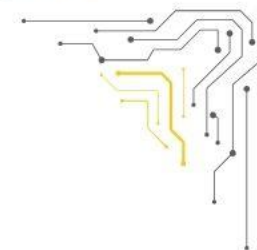


Helios – Reactor GOLD

The Solutions Company

Helios – Reactor GOLD



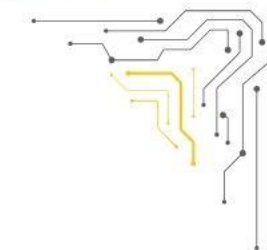


Helios Reactor Gold

The two central topics when discussing GOLD:

1. **Reactor GOLD quality is critical to wafer performance, tunability, and manufacturing consistency**
2. **GOLD configurations vary leading to inconsistencies in tool to tool performance, recipe optimization and film performance**





Helios Reactor Gold

Reactor GOLD quality is critical to wafer performance, tunability, and manufacturing consistency:

- **Gold is used in reactors for its emissivity properties, temperature tolerance and corrosion resistance**
 - **Degraded or low quality Gold can cause thermal anomalies**
- **Degraded or poor quality Gold leads to different tuning of each reactor for the same recipe**
 - **Many Fabs must continually augment recipes to compensate for temperature changes / degraded Gold**



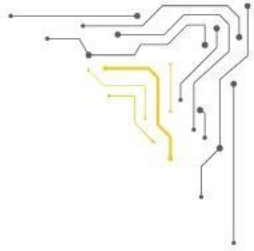


Helios Reactor Gold

GOLD configurations vary across tools, leading to inconsistencies in tool to tool performance, recipe optimization, manufacturing and film performance

- **There are many configurations of gold available**
 - **Number of parabolic, stippling**
- **Most fabs have multiple configurations – not consistent across the fleet**
 - **Leads to performance issues as well as spares challenges and availability**
- **Many customers have changed their product mix for more demanding Epi films**
 - **More demanding films require greater temperature control gained from some gold configurations**



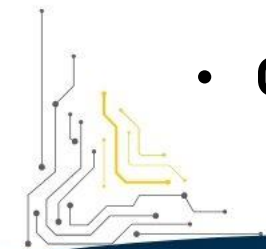


Helios Reactor Gold

Is it time to upgrade your Gold?

Helios manufactures quality gold and in all configurations

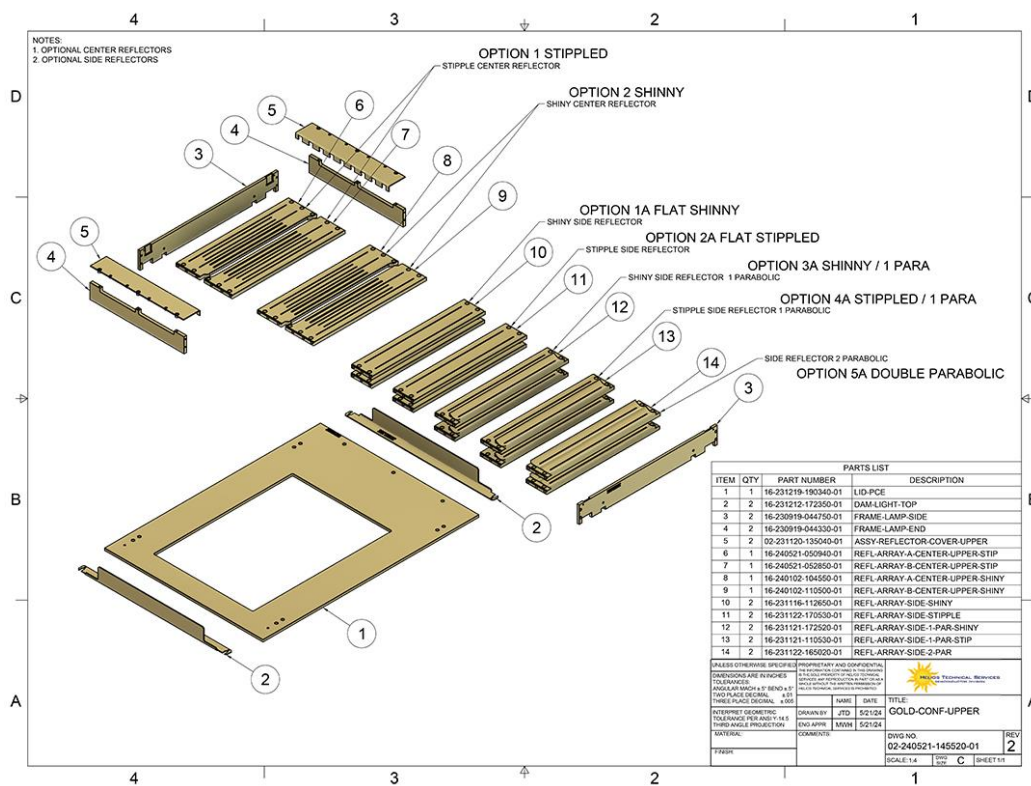
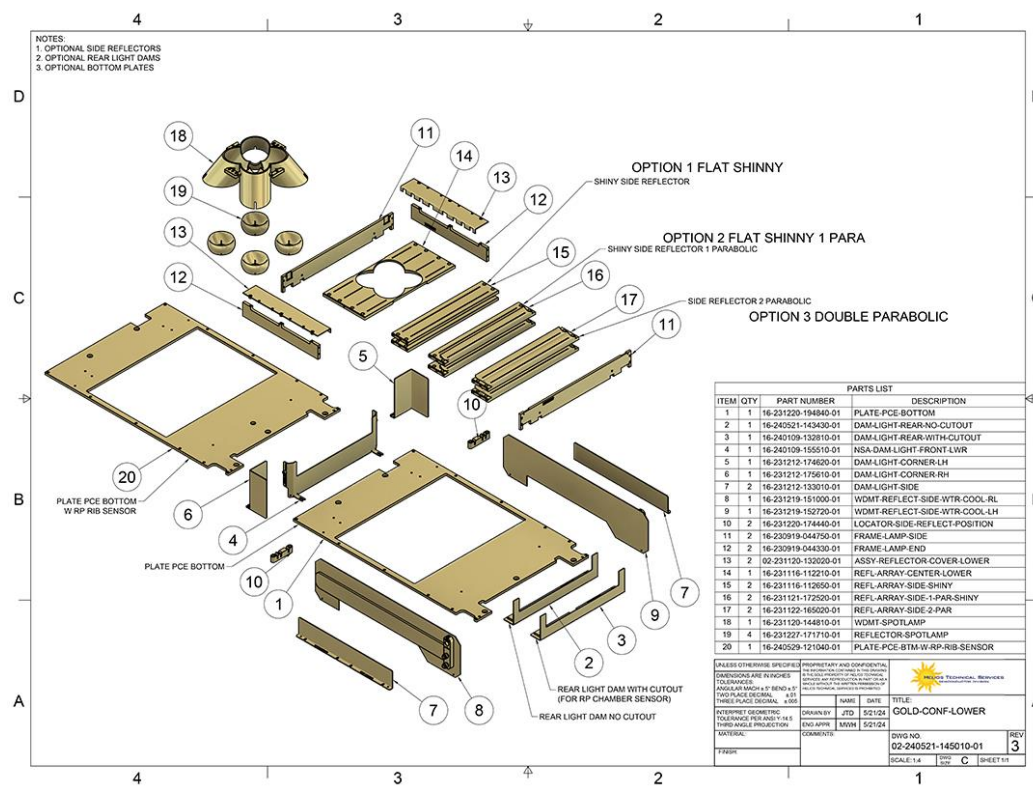
- **Let Helios supply you with the best gold configuration for your Processes**
 - **Create a Gold configuration best suited for your needs**
- **With your optimized Helios Gold configuration, you can stock useful spares and upgrade your other reactors in a timely manner**
- **Replace your old, worn out, or damaged gold**
- **Consistency and availability in spare gold**



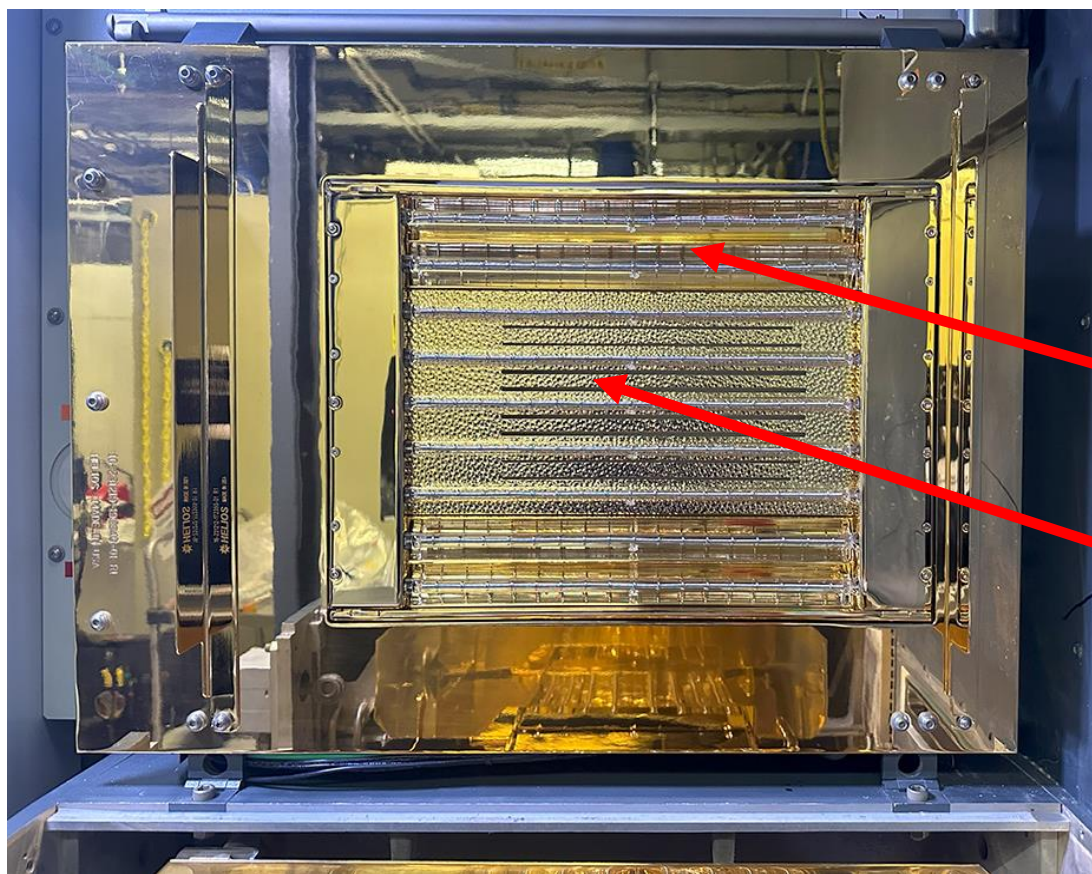


Helios Reactor Gold

All configurations (choices) for both Upper and Lower



Helios Reactor Gold - example



Option for best performance and tunability

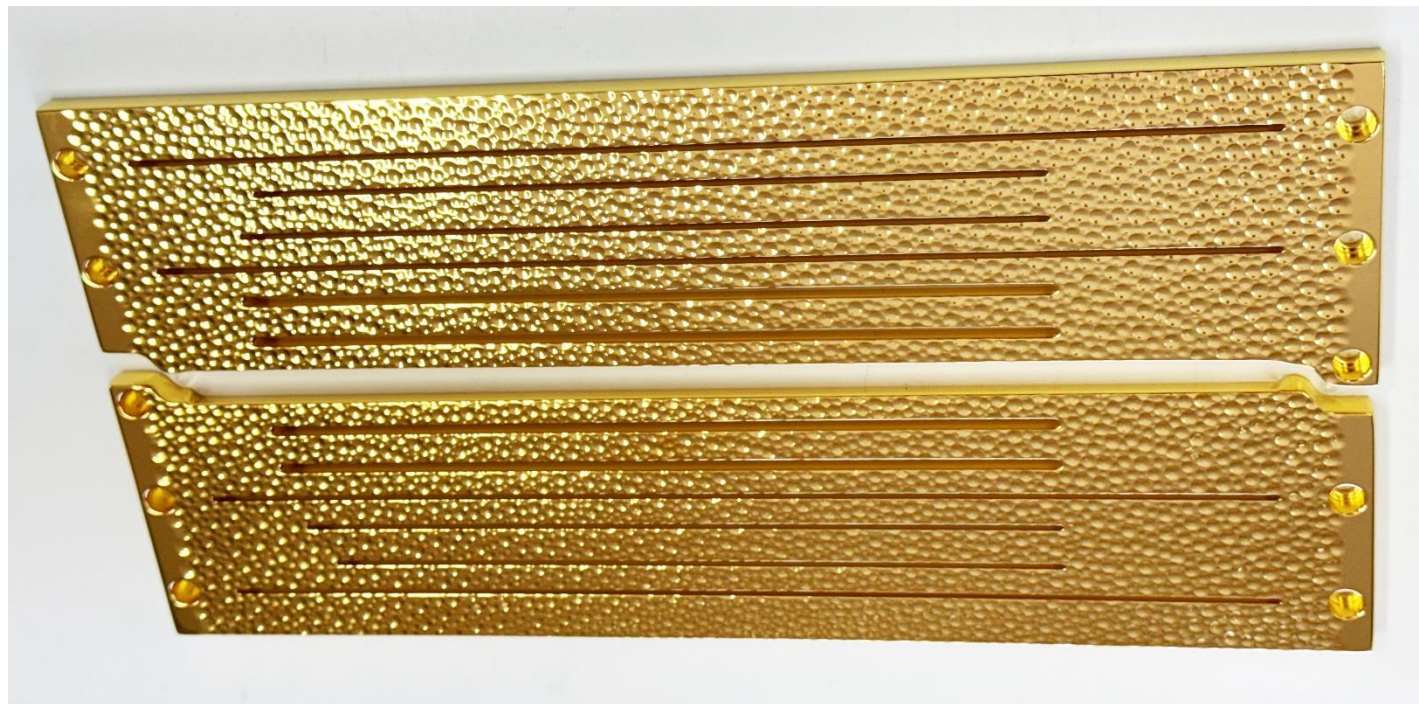
Dual Parabolic

Stippled, shinny

Helios Reactor Gold - example

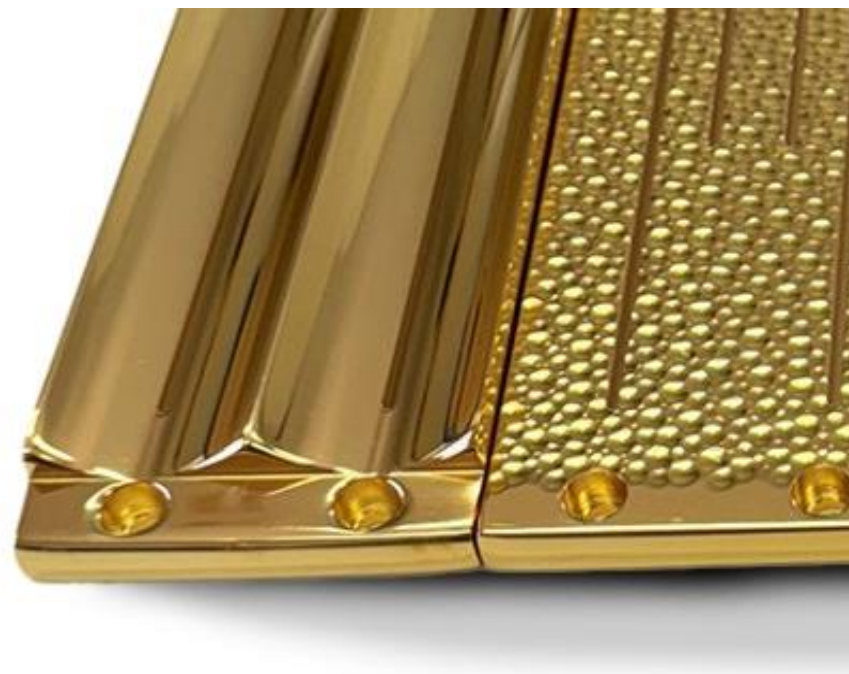
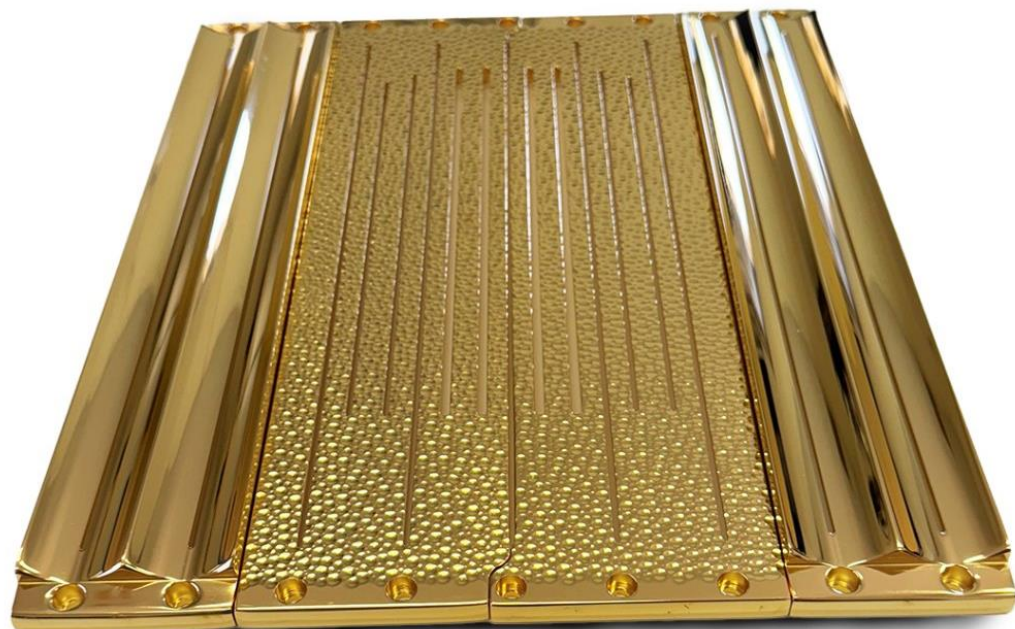


Helios Reactor Gold - example

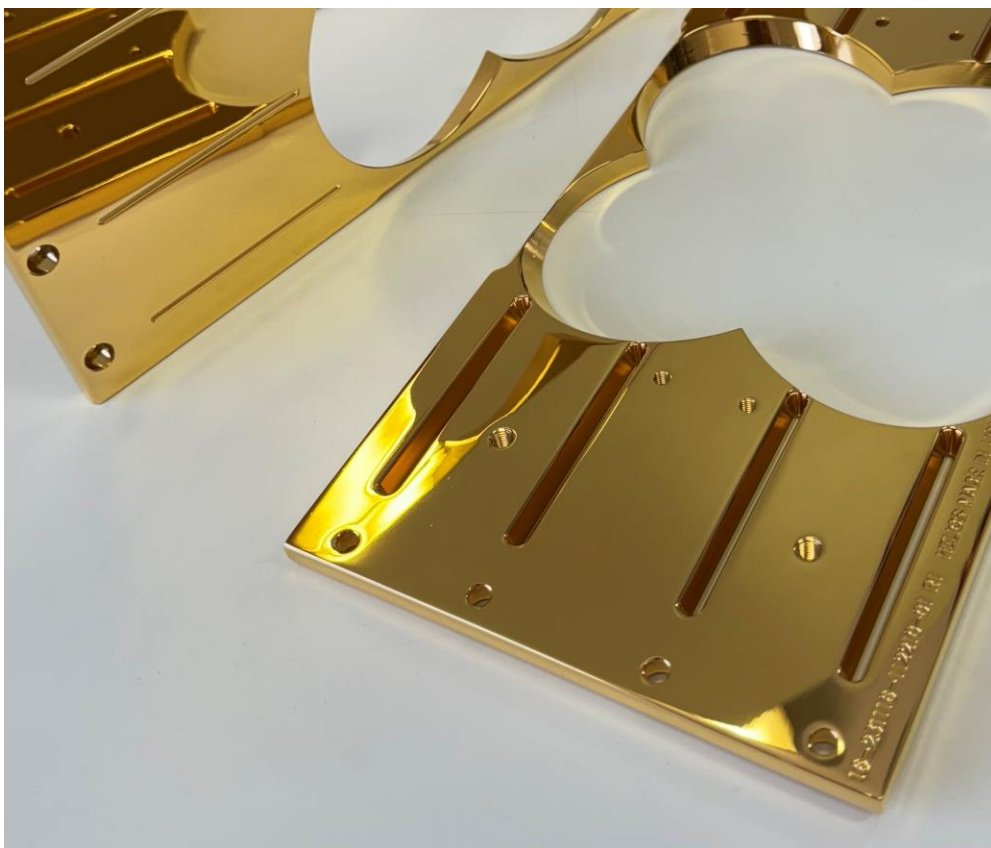




Helios Reactor Gold - example

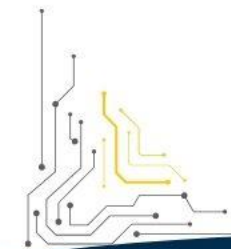
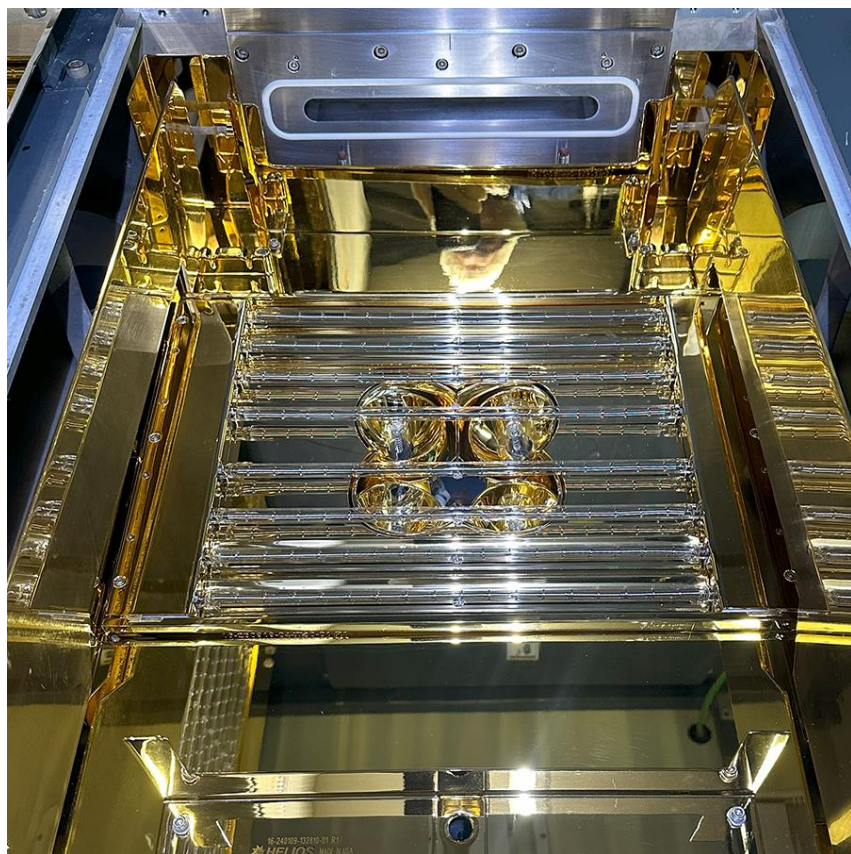


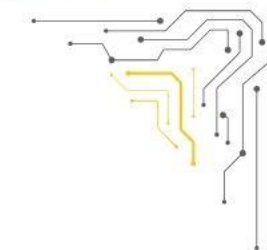
Helios Reactor Gold - example



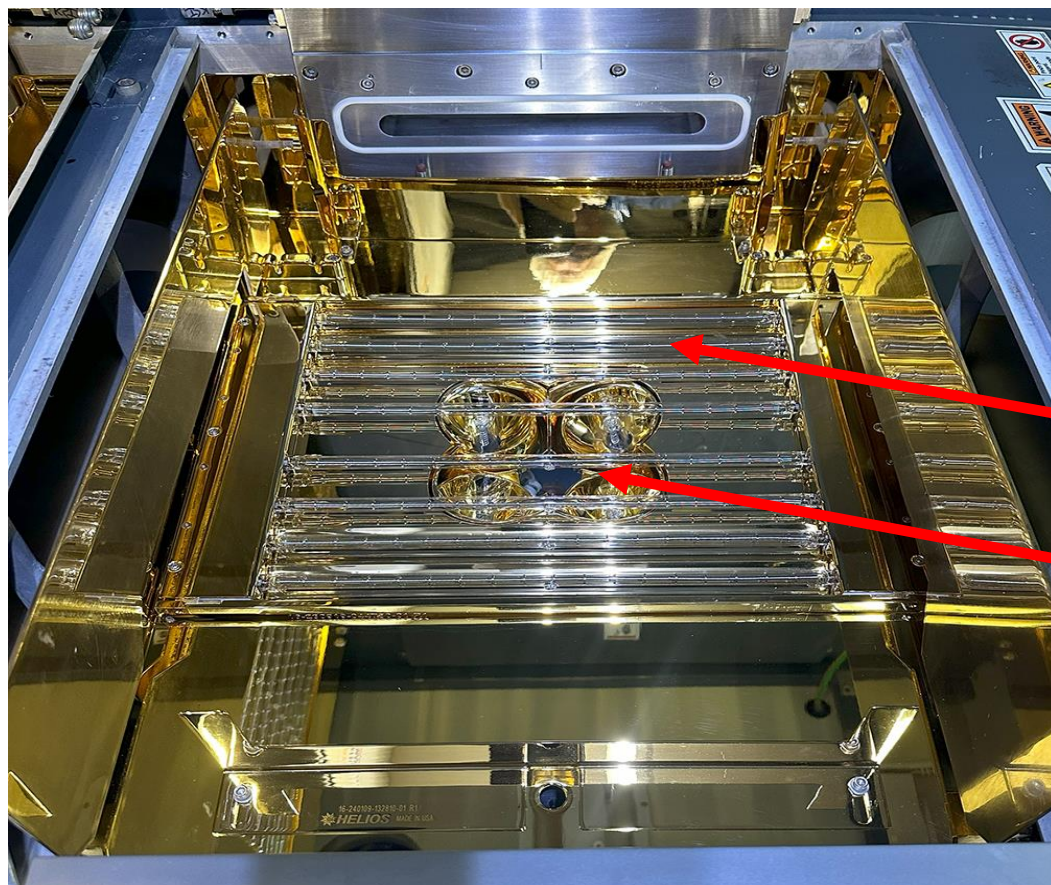


Helios Reactor Gold - example





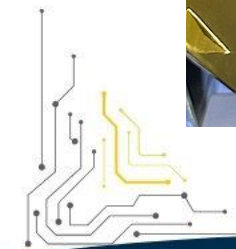
Helios Reactor Gold - example



Option for best performance and tunability

Dual Parabolic

Adjustable Spotlamps



Helios – Reactor Gold – Reconditioning

Helios can typically recondition your current gold components for approximately 70% of new cost



Damaged and reconditioned shown