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Auger PRIME

Grenoble SSD Assembly Site

Assembling Tips and tricks Critical points



Murielle Heusch

Grenoble, March 2018



LPSC SSD Assembly Site

- **Assembly line and test bench**
 - Main place : « Ariane » Hall (shared with other experiments)



LPSC SSD Assembly Site

- **Assembly line and test bench - machining**

- Grove in the composite panel carved out in another place
- Same technique as in Lecce
 - Using a homemade Jig
 - Ripper + Thermal cutter





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LPSC SSD Assembly Site

- **Assembly line and test bench - Storage**

- Welded frames, top covers, composite panels stored in a tent
- SSD storage before shipment



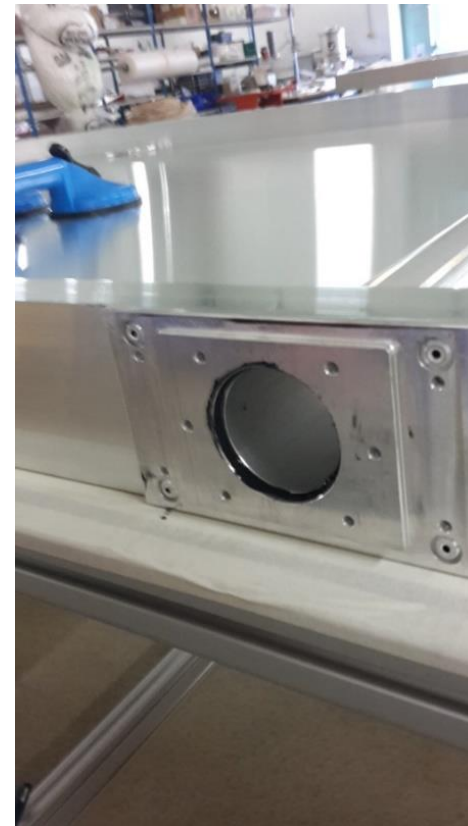


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LPSC SSD Assembly Site

- **Assembly line : 3 areas**

- Gluing table
 - sandwich panel glued to the frame
 - brackets and sintered metal pieces installation

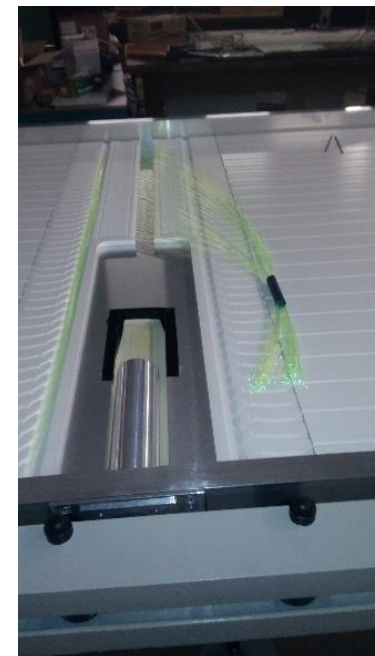




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LPSC SSD Assembly Site

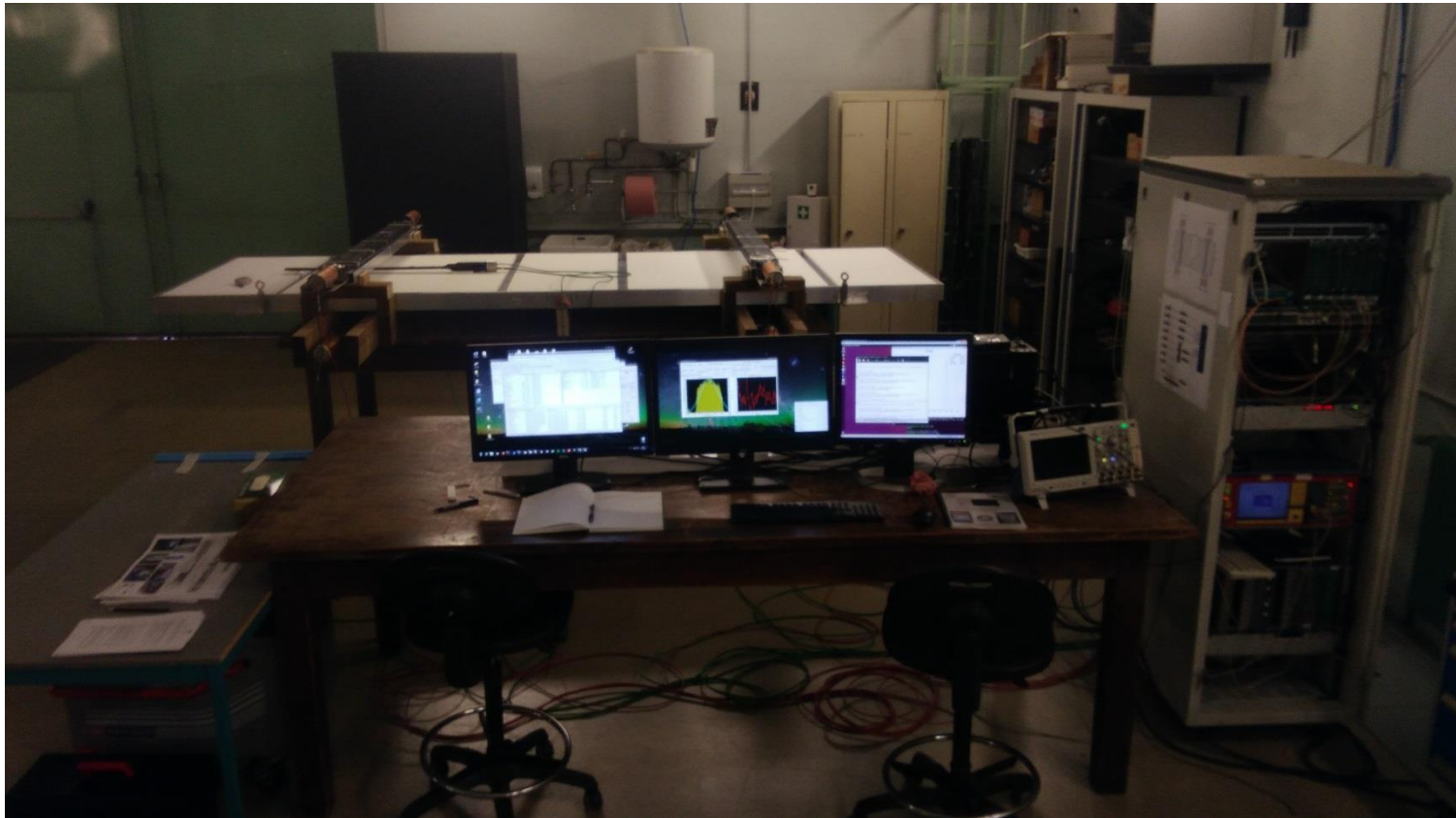
- **Assembly line : 3 areas**
 - Tilting table
 - scintillator bars assembling
 - optical fibers integration
 - Cookie : melting fibers, gluing of the fibers bundle





LPSC SSD Assembly Site

- **Assembly line : 3 areas**
 - Test and validation zone
 - SSD temporarily closed (light tight)
 - Tests , cf Julien's talk next session



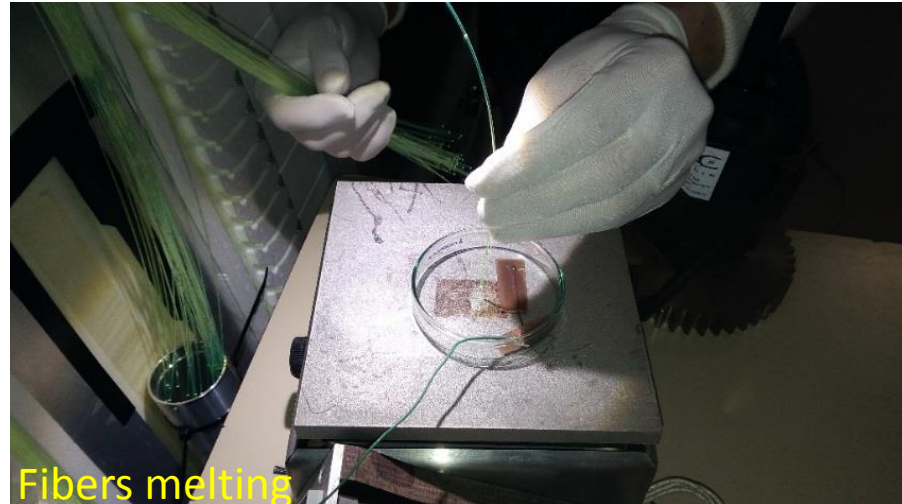


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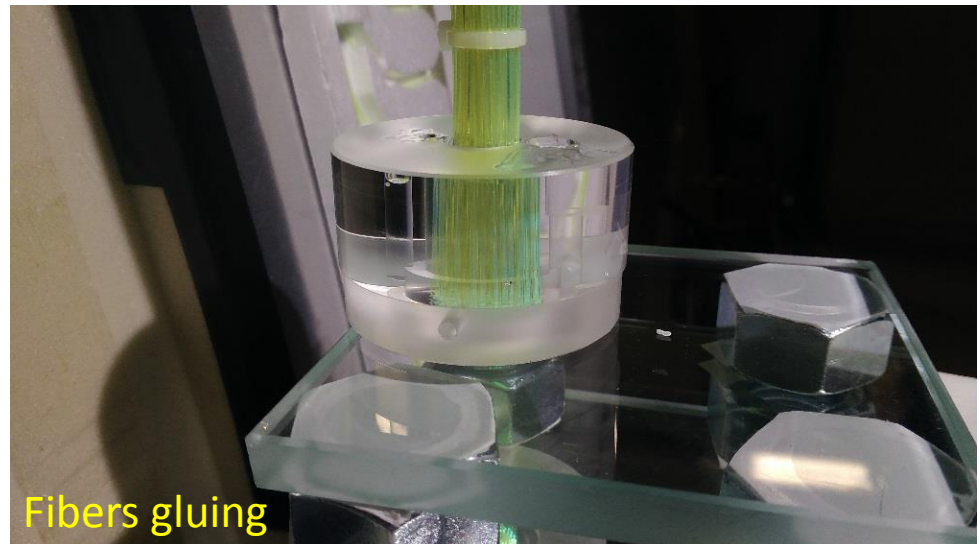
LPSC SSD Assembly Critical Points



Fibers alignment



Fibers melting



Fibers gluing

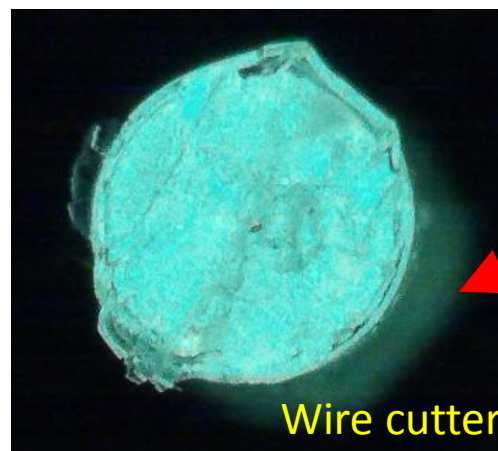


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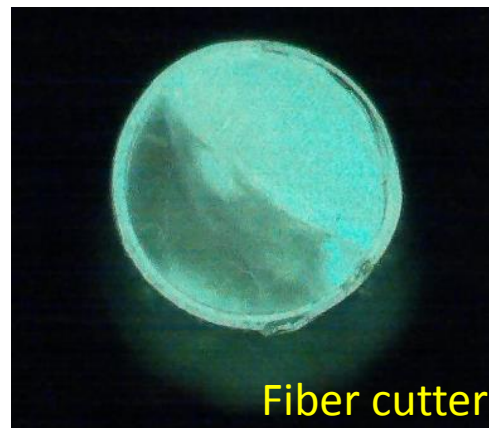
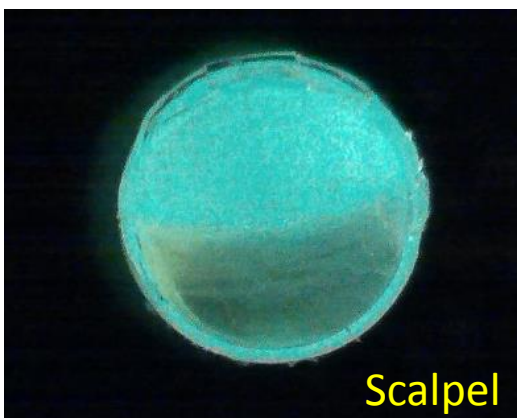
LPSC SSD Assembly Critical Points

- **Fiber cutting**

Differences according to the tool.



Our
choice





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LPSC SSD Assembly Critical Points

- **Fibers alignment**

- All fibers cut to the same length
- Difficulty to have all fibers at the same level in the cookie (routing dependent)





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LPSC SSD Assembly Critical Points

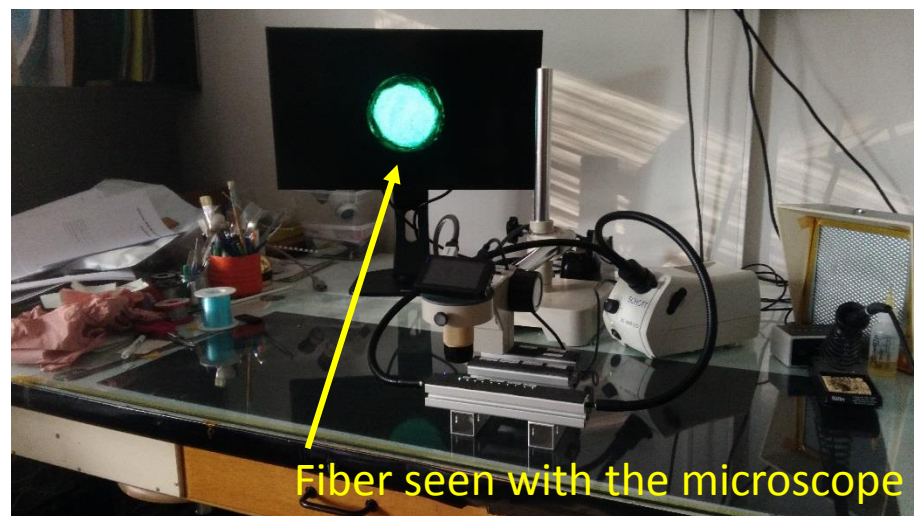
• Fibers melting

Aim:

- To find the optimal temperature
- To reproduce expertise and conditions observed in Karlsruhe and Lecce.

Melting tests:

- melting fibers on the bottom of a crystallizer
- different times at different temperatures
- results observed with a microscope

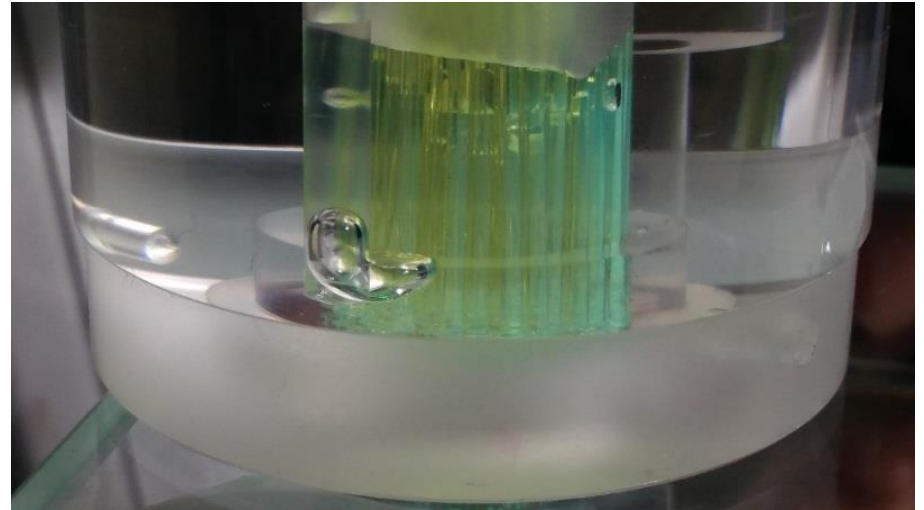




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LPSC SSD Assembly Critical Points

- **Fibers gluing:**
 - No difficulty:
Easy evacuation of bubbles
 - Except for the glue outgassing process:
Bubbles take a long time to disappear





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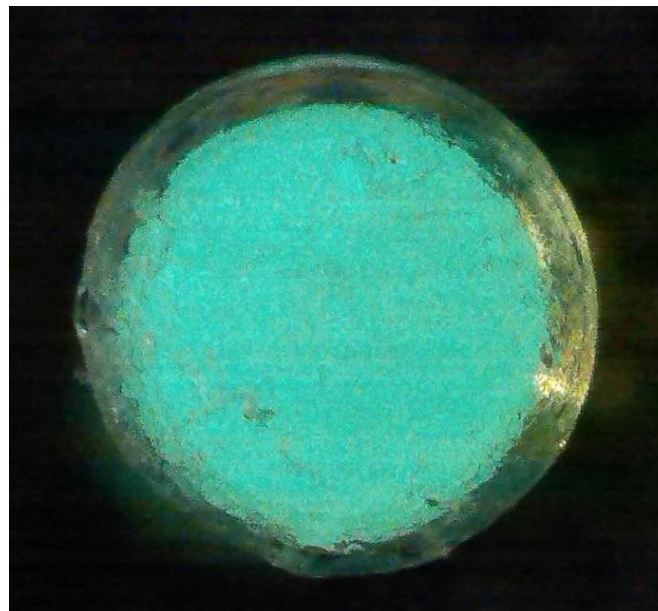
LPSC SSD Assembly Critical Points

- **What we did:**

- Fibers cut with a wire cutter
- Melt fibers at 220°C →
- Outgassing glue during 45mn

The surface of a melted fiber is very dependent on the way and duration the fiber is melt

What is acceptable?



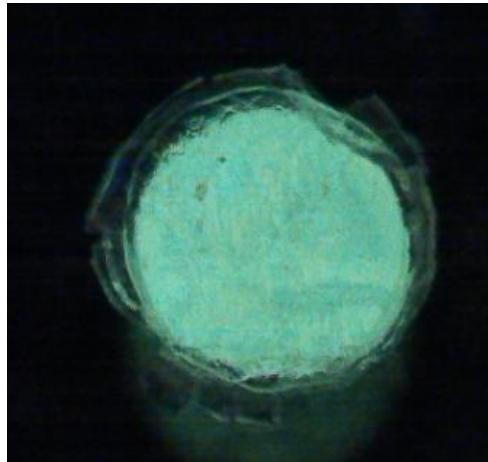
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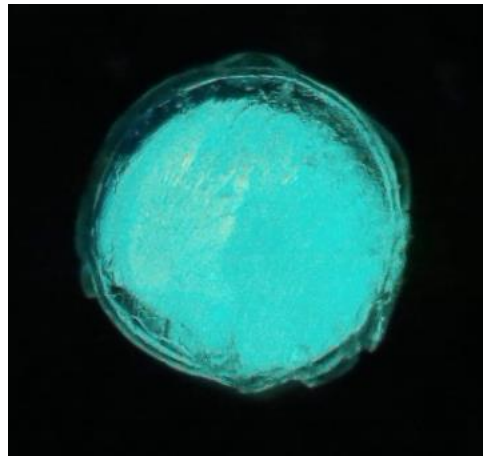
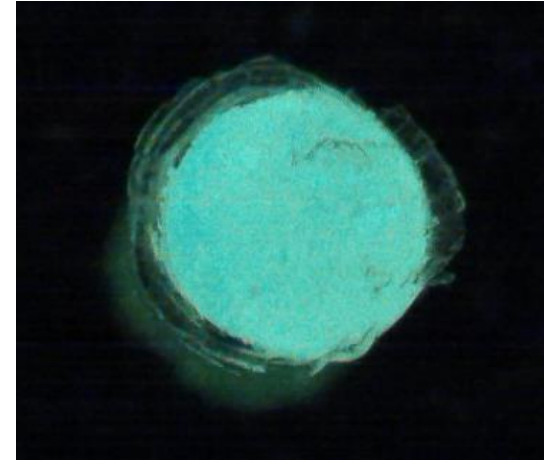
LPSC SSD Assembly Critical Points

- **Fibers melting tests:**

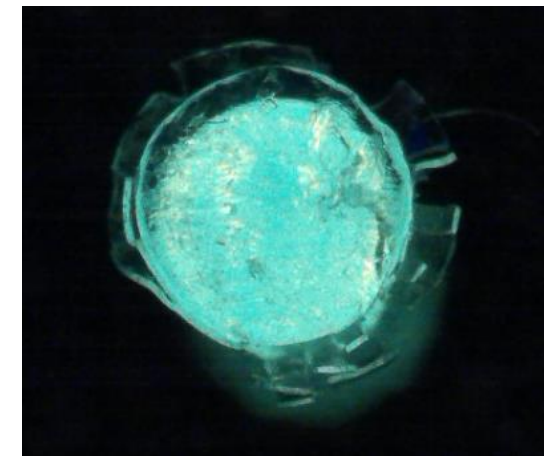
- Melting duration
~150°C



1s



3s

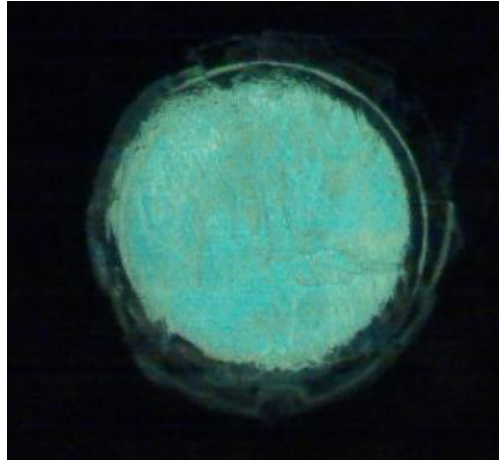




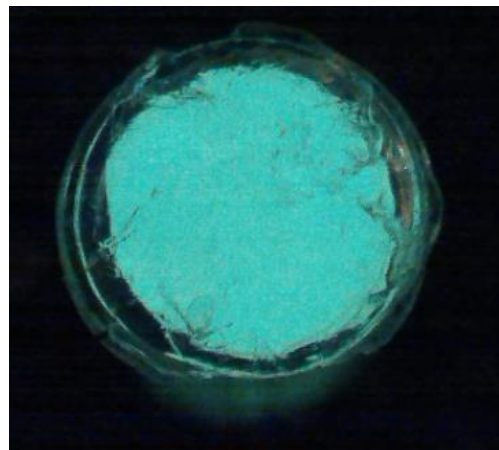
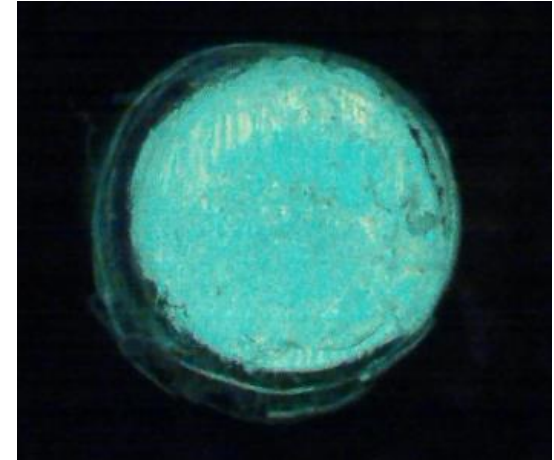
LPSC SSD Assembly Critical Points

- **Fibers melting tests:**

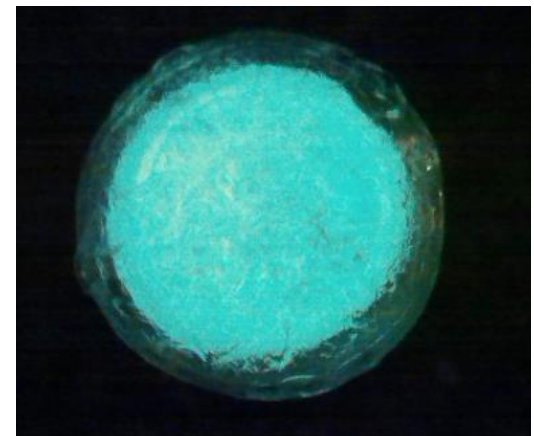
- Melting duration
~180°C



1s



3s





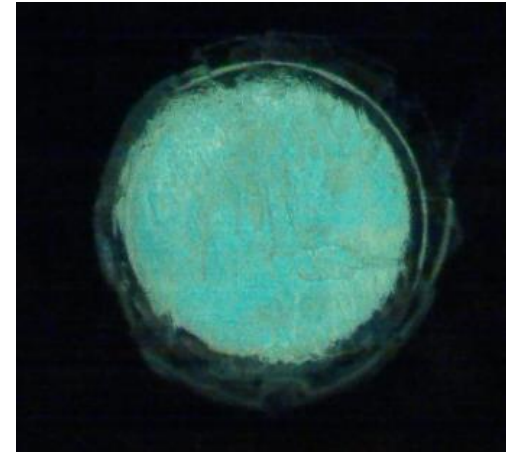
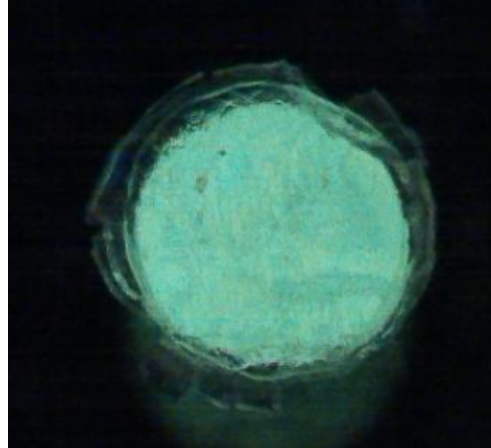
LPSC SSD Assembly Critical Points

- Fibers melting tests:

150°C

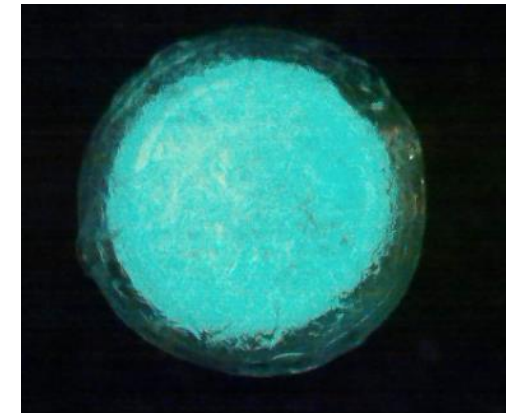
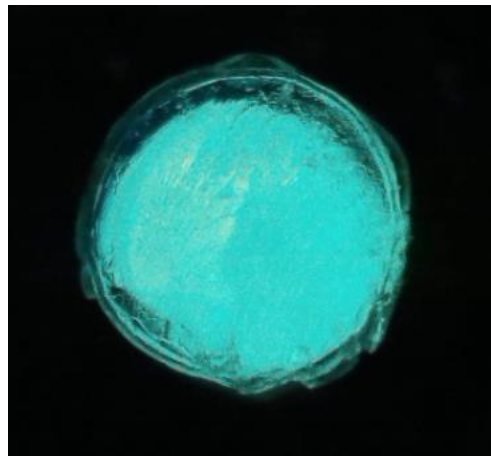
180°C

1s



How to choose?

3s



LPSC SSD Assembly

- **Our plan:**

- **Some additional tools need to be built
like a special tool to fix fibers bundle easier**

- **Production capability = 3 SSD every 2 weeks
= 90 units in 2 years**

low manpower, 9 persons but not full time , 3.05 FTE

- **Help expected with students**