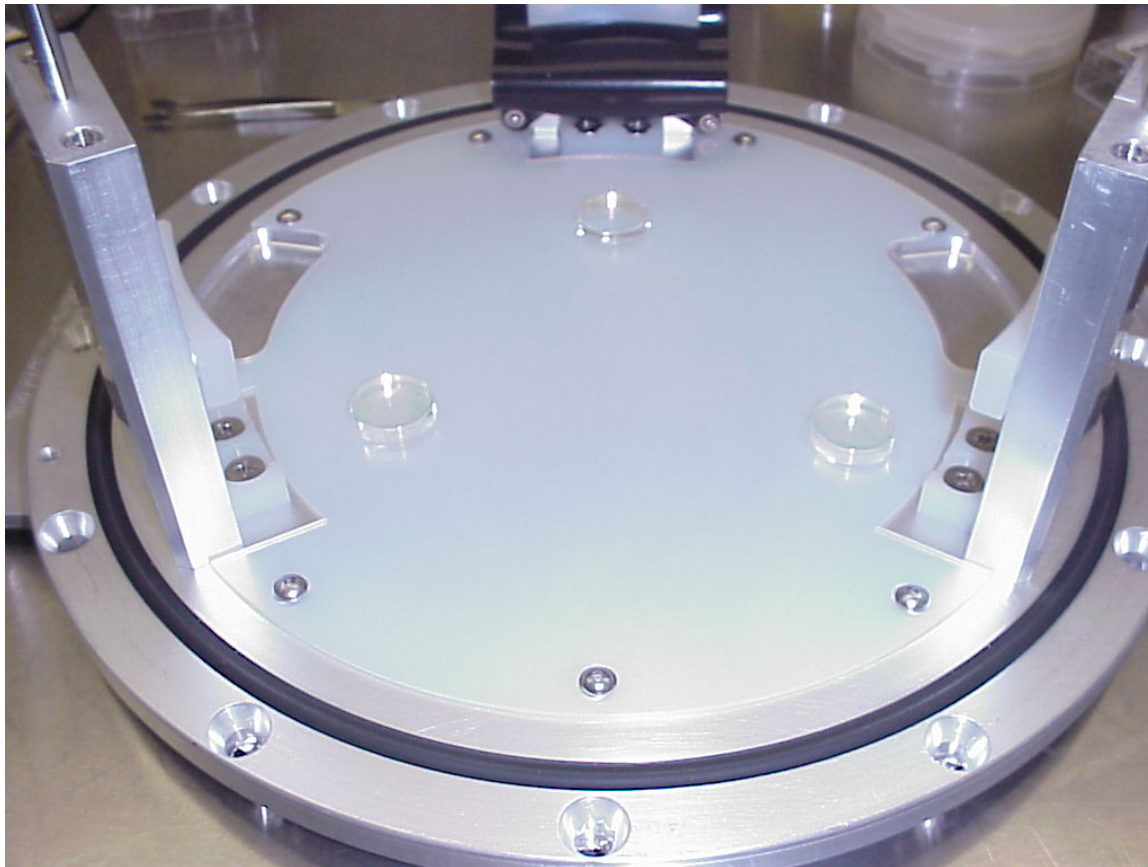


Inspection of shipping and carrying mirror cases

The shipping and carrying cases used to transport the last two LIGO test masses were closely inspected to investigate the origin of the large amount of fine dust noted covering the mirror's surfaces. Note that these tests evaluated only the top surface of the mirrors. In the actual "heavy dust incident", particles were mostly observed on the mirror surface facing the bottom of the case.

Inspection of the aluminum mirror carrying case

- 1) Opened the case and checked the seal's integrity, it was fine.
- 2) Inspected for dust particles with a high intensity light source. Observed a few dark particles and some fibers.
- 3) Checked that there were not problems with the screws when closing. All worked fine.
- 4) Installed 3 cleaned 1" dia. mirrors to the base of the case secured with double sided tape. These mirrors were previously inspected under a dark field microscope and with a high intensity light source to ensure their cleanliness.



- 5) Screwed closed the aluminum case.

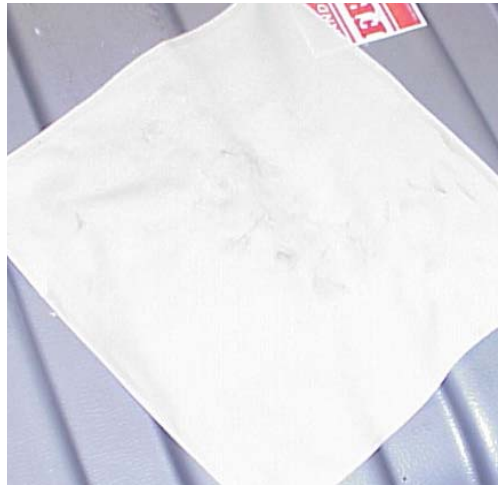
- 6) Turned the case up-side down several times (5 at least), deposited the case on a table after each turn, allowing it to fall from a distance of approximately 1/16”.
- 7) Opened the case and inspected the mirrors for dust particles. Just a few dust particles were noticed around the mirror’s edge.

Inspection of the gray shipping case

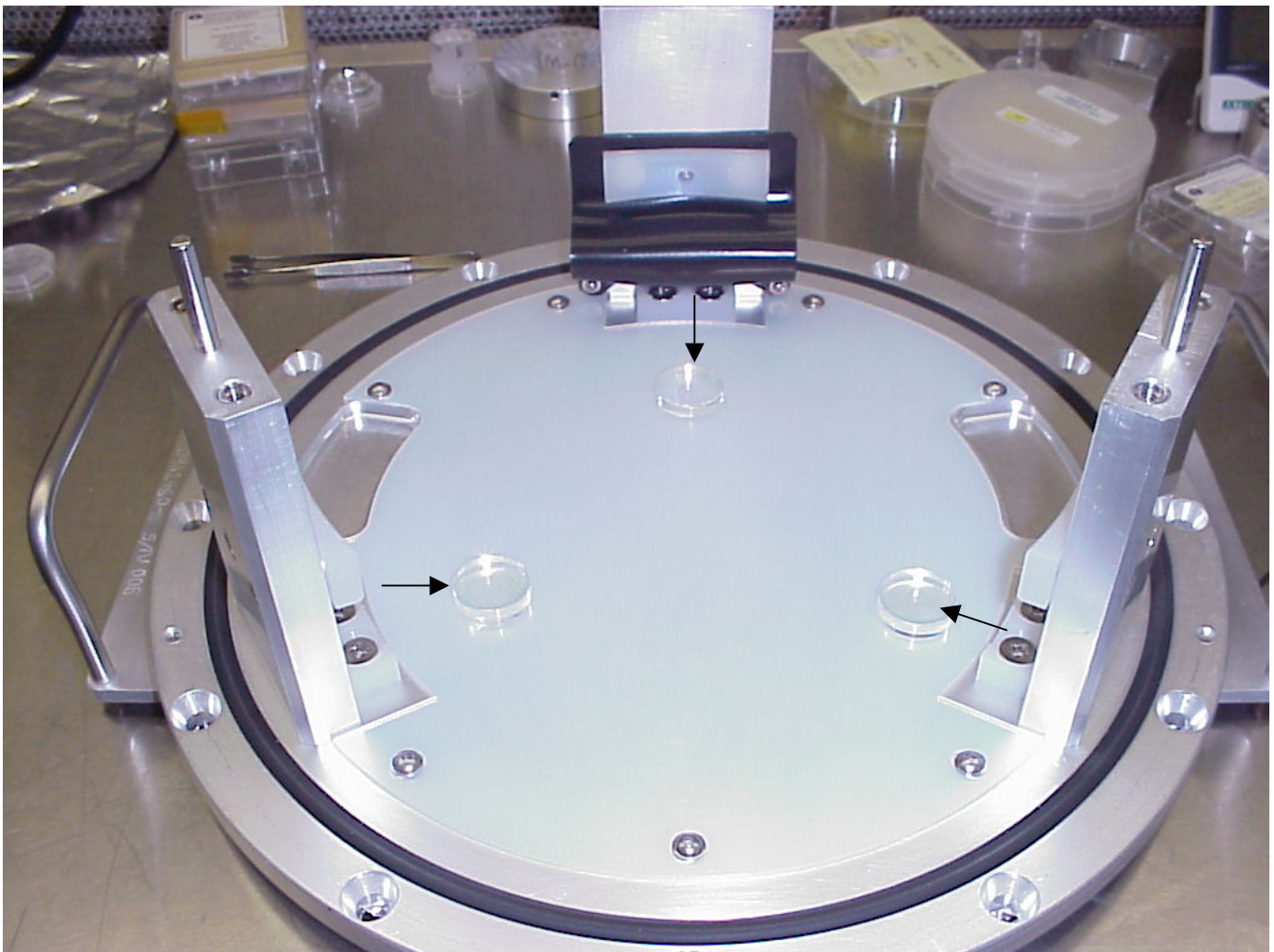
- 1) Checked the drop sensors. They were OK.
- 2) Checked the grey case’s lining foam; it was OK and there were not tears.
- 3) Visually checked the wooden case. It appeared in good condition.



- 4) Placed the aluminum case with the 3 cleaned mirrors inside the wooden case. The mirrors attached to the aluminum case were cleaned and inspected.
- 5) Closed the wooden case and the large grey case.
- 6) Turned the grey case upside down several times (5 at least) and allow it to drop from side to side about 5 times. Left undisturbed over the weekend.
- 7) Opened the grey shipping case and the wooden box and removed the aluminum case.
- 8) Upon close inspection of the wooden case, a few dark particles were observed on the bottom. Cleaned with a white cloth wetted with methanol, dark stains were visible on the cloth.

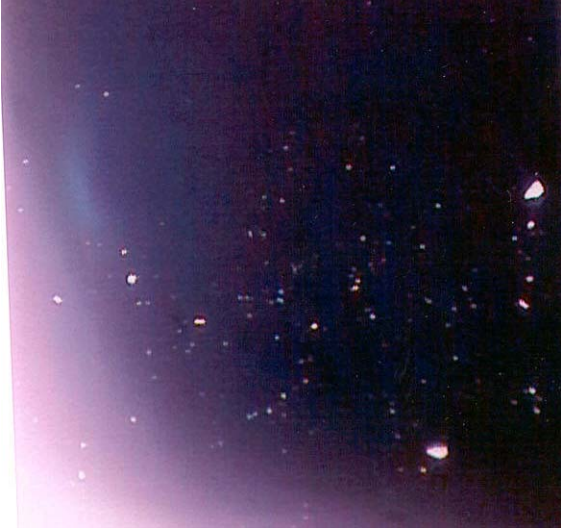


- 9) Opened the aluminum case and inspected the mirrors for dust particles
- 10) All three mirrors showed fine dust particles on the edge facing the aluminum posts.



The arrows point to the edge of the mirrors that showed an increased incidence of dust

Edge of mirror



Center of mirror

