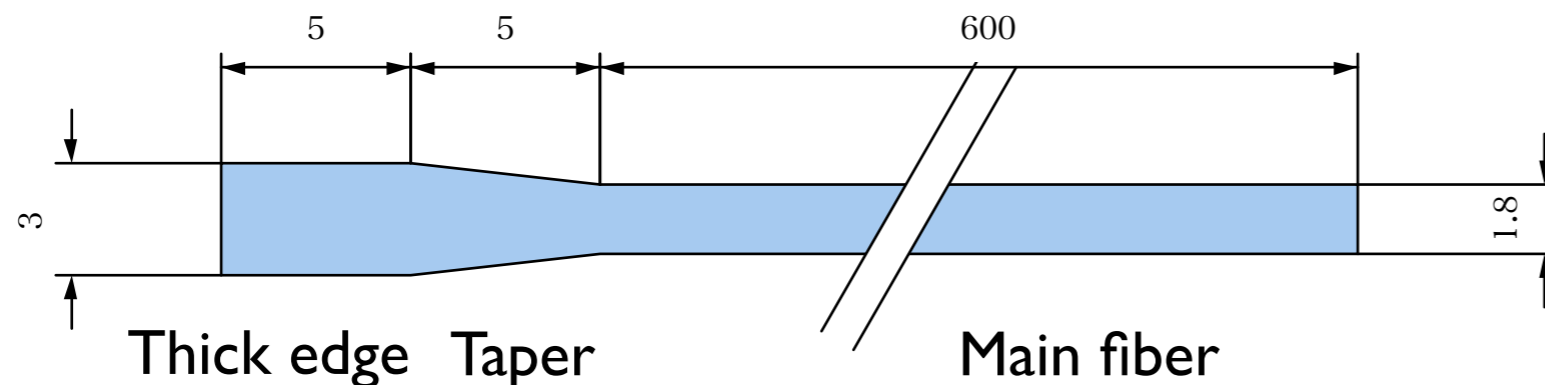- Cryogenic payload meeting 2011/08/31+09/28
- Takashi Uchiyama
- Title: Tapered sapphire fiber

- Contents
  - What is the tapered sapphire fiber.
  - Ideas for LCGT suspension using the tapered sapphire fiber.
  - Negotiation with Moltech.

2011年 9月 27日 火曜日

- What is the tapered sapphire fiber.
- A sapphire fiber with a thick edge.
- We have already asked a dealer about the possibility of the example fiber.
- Answer: YES, possible.
  - Φ1.8mm×600mm is possible. (Shorter fiber is enough for us.)
  - No taper fiber is impossible.
  - Larger edge diameter is possible.
- We should investigate more design options for the best design.
- Anyhow, we can buy it and test it.

Example of the tapered fiber.

5   5   600

3

1.8

Thick edge Taper   Main fiber

Core diameter: 1.8mm.
Core length: 600mm.
Tapered length: 5mm.
Edge diameter: 3.0mm.
Edge lengthL 5mm.
2011/08/11
Takashi Uchiyama
ICRR,the Univ.of Tokyo.

- Ideas for LCGT suspension using the tapered sapphire fiber.
  - Attach clamp parts to sapphire mirrors.
  - The clamp parts may have holes or slots.
  - Pass the tapered sapphire fiber through the hole or slot.
  - Hook the clamp parts by the thick edge of the tapered sapphire fiber.
- We need...
  - Design of the tapered sapphire fiber.
  - Design of the clamp part.
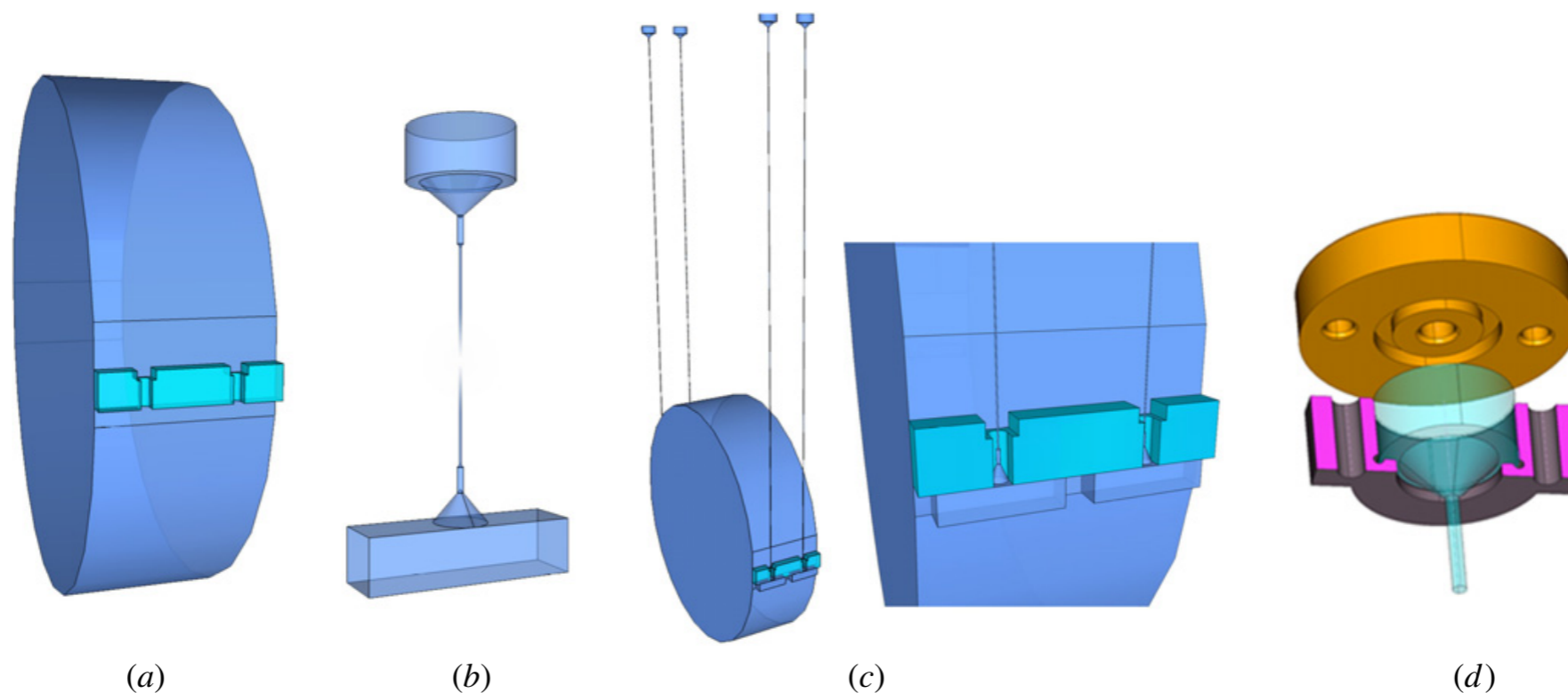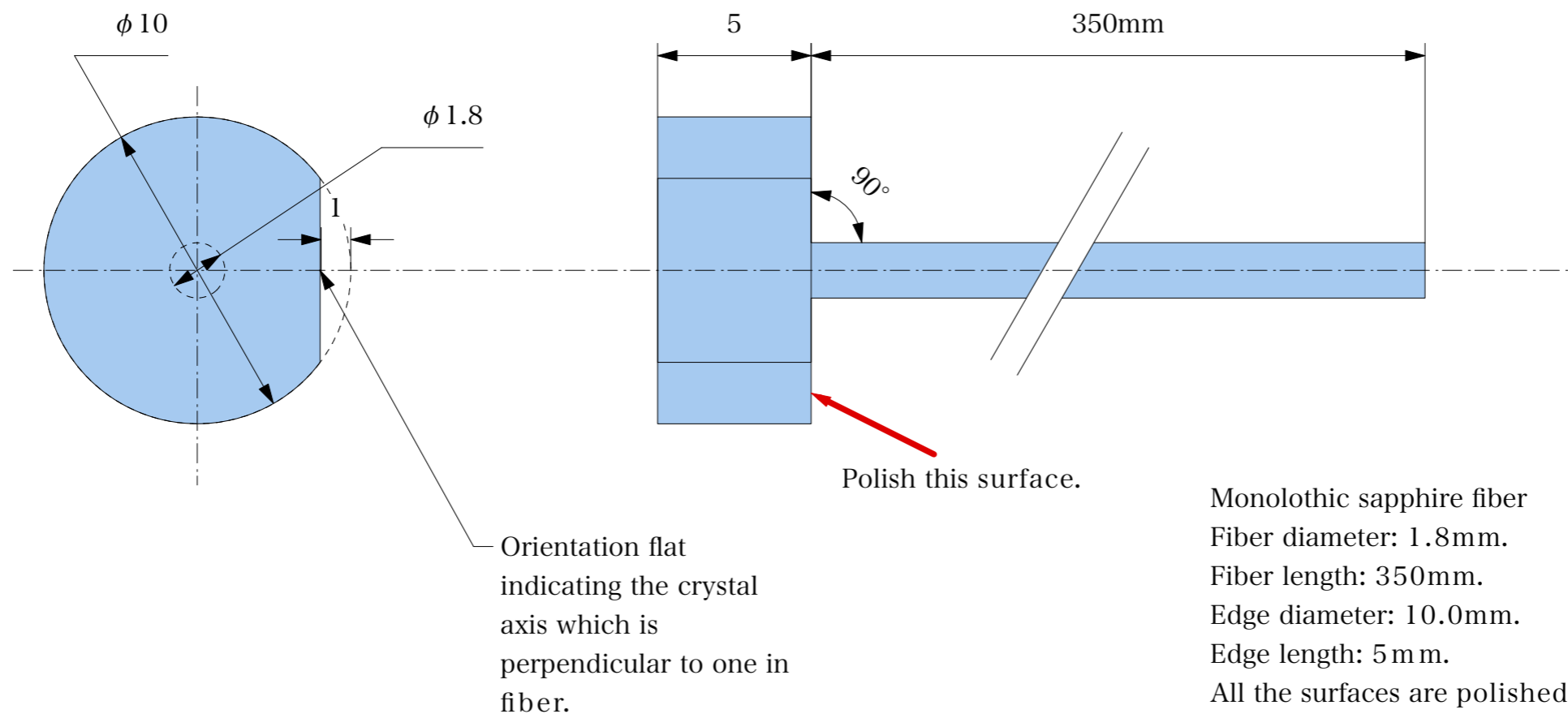 - Method to attach the clamp parts to the mirrors.

(a)   (b)   (c)   (d)

Figure 2. Sketch of the steps followed to realize a monolithic suspension, as detailed in the text.

2011年 9月 27日 火曜日

- Negotiation with Moltech.
- Moltech is a company in German.
  - http://www.mt-berlin.com/
  - Single crystal, materials, components for science...
- We are negotiating with them directly now.

- We also asked the possibility of the tapered sapphire fiber to ...
  - Photoran in USA and
  - Kyocera in Japan.
  - No answer still now.

4

- Monolithic sapphire fiber.
- Method is EFG.
- Polished only the end sides.
  - We asked try to polish the surface indicated with the red arrow in the bottom figure.
- Bubbles content depends on pulling up speed.
  - We asked control the speed to make the bubbles as small as possible.
- Impurities depend on the quality of raw materials.
  - We asked select the raw material with the lowest impurities.

- We would like to buy 3 different axis directions and 4 fibers for each direction.
- We are waiting for the cost estimation.

ϕ 10

ϕ 1.8

1

5   350mm

90°

Polish this surface.

Orientation flat
indicating the crystal
axis which is
perpendicular to one in
fiber.

Monolothic sapphire fiber
Fiber diameter: 1.8mm.
Fiber length: 350mm.
Edge diameter: 10.0mm.
Edge length: 5mm.
All the surfaces are polished.
2011/09/16
Takashi Uchiyama
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