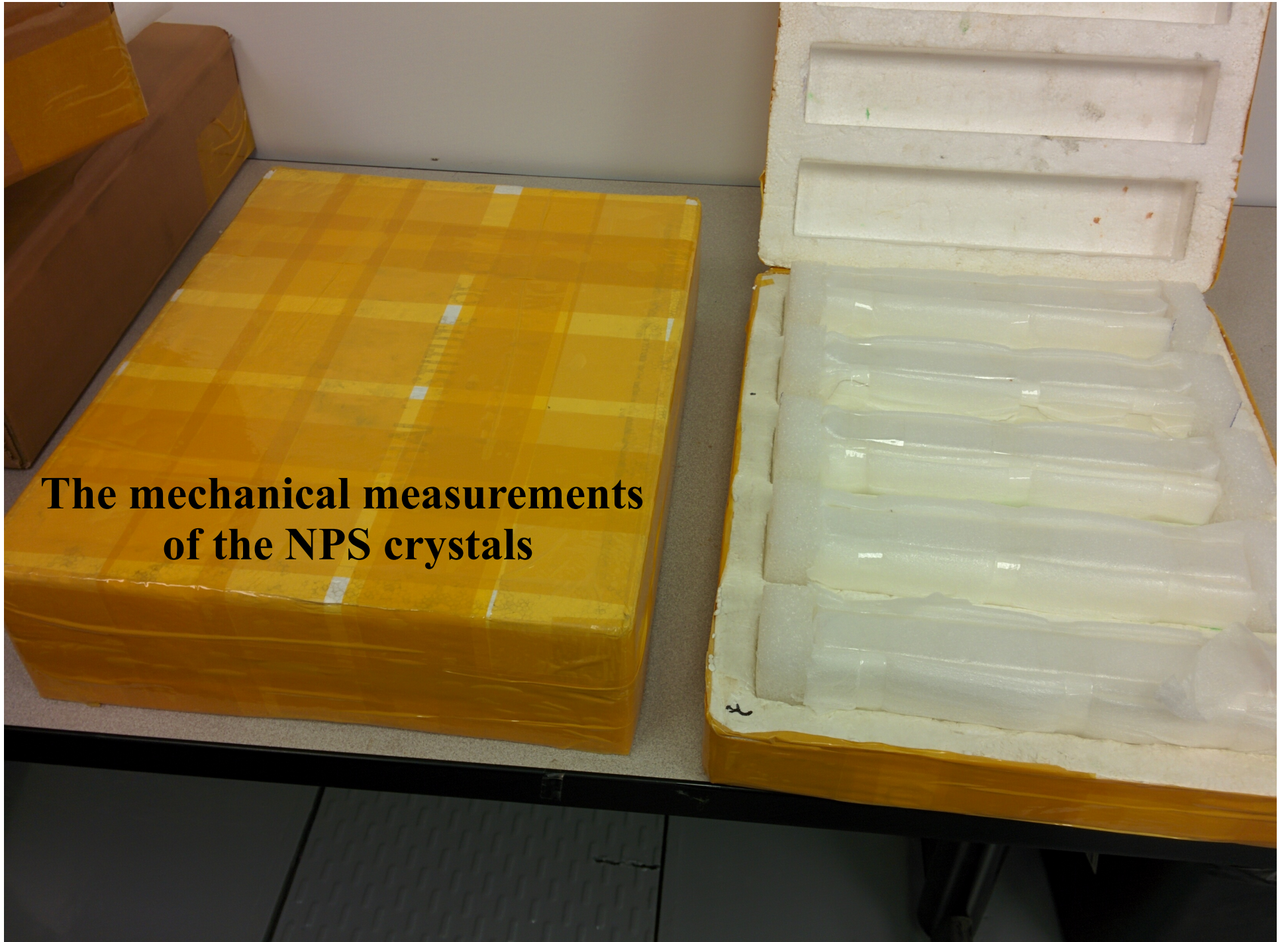


**The mechanical measurements
of the NPS crystals**



The crystals pack:

- 1) Crystals arrived in 16 boxes
- 2) Ten crystals per box
- 3) Two crystals packed together



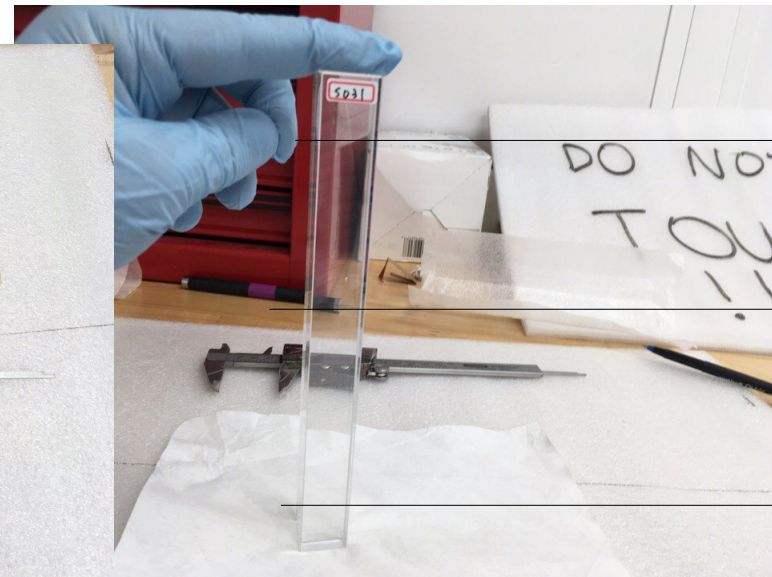
Size measurements:

- 1) Tape to the caliper edges for excluding minor damages of the crystal
- 2) Two measurements per row for each size with the caliper
- 3) Caliper re-calibrated after each row

Tools Error:

Length: 0.5mm

Caliper: 0.05mm



Top

Middle

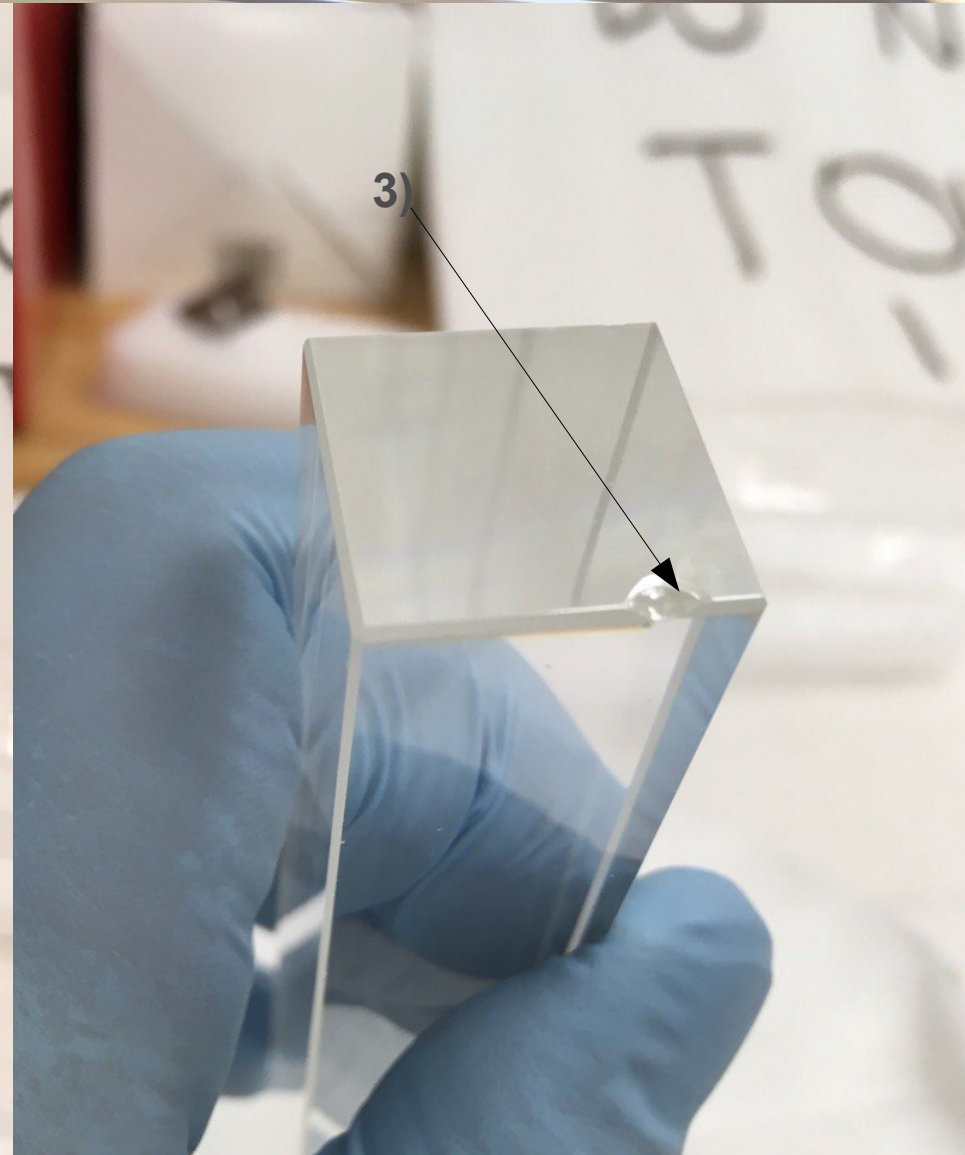
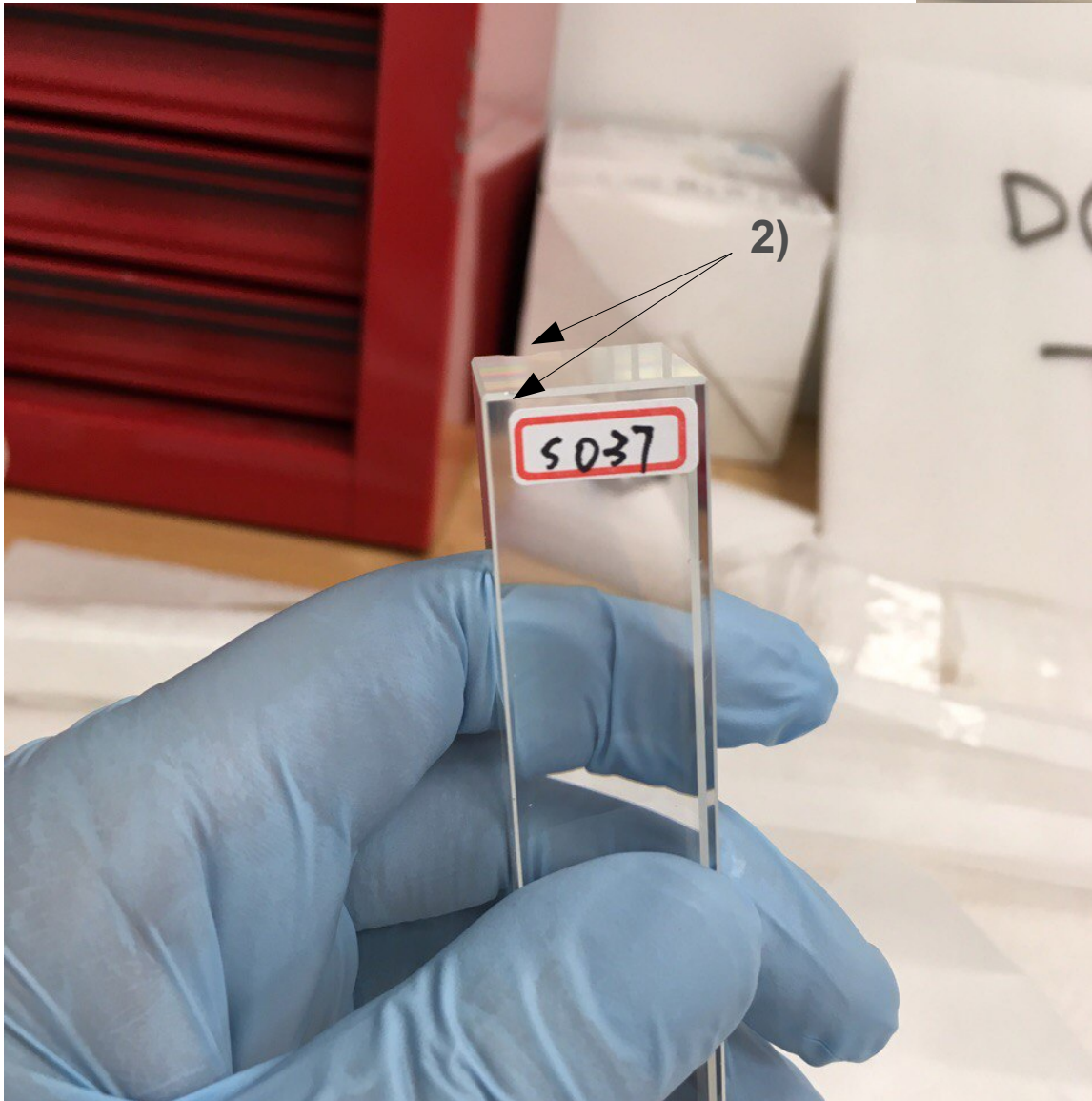
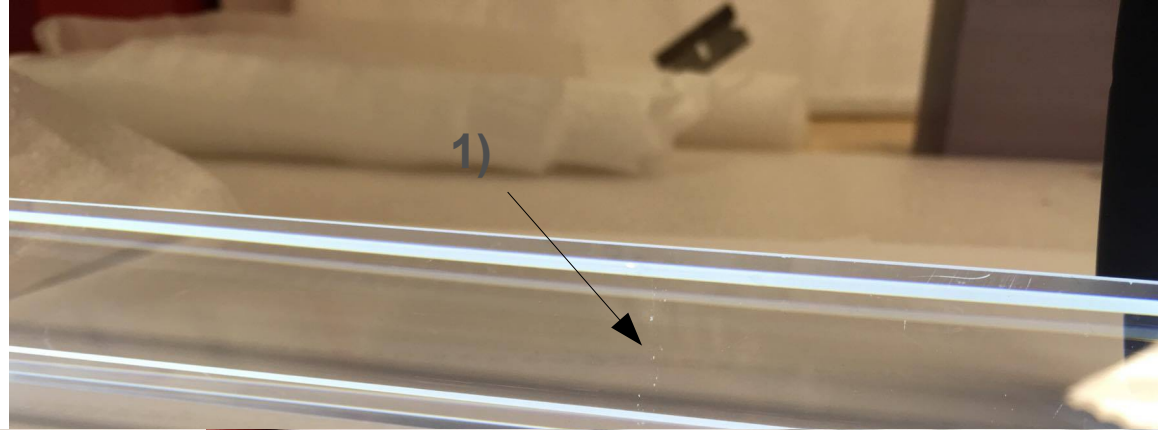
Bottom

N	Label	Length	Top-1-1	Top-1-2	Top-2-1	Top-2-2	Middle-1-1	Middle-1-2	Middle-2-1	Middle-2-2	Bottom-1-1	Bottom-1-2	Bottom-2-1	Bottom-2-2
1	5032	200.5	20.43	20.46	20.59	20.69	20.49	20.56	20.54	20.56	20.55	20.42	20.46	20.45
2	5031	200.5	20.47	20.4	20.46	20.49	20.46	20.44	20.52	20.56	20.39	20.37	20.46	20.5
3	5033	200.5	20.53	20.52	20.57	20.51	20.57	20.57	20.56	20.55	20.52	20.53	20.51	20.53
4	5036	200.5	20.55	20.55	20.51	20.5	20.6	20.62	20.59	20.54	20.52	20.55	20.47	20.5
5	5034	200.5	20.53	20.52	20.5	20.51	20.67	20.66	20.54	20.53	20.52	20.51	20.47	20.54
6	5035	200.5	20.59	20.55	20.53	20.49	20.59	20.56	20.52	20.54	20.51	20.52	20.55	20.54
7	5039	200.5	20.67	20.65	20.66	20.61	20.59	20.53	20.56	20.53	20.52	20.55	20.52	20.51
8	5037	200.5	20.58	20.6	20.53	20.57	20.52	20.51	20.52	20.53	20.52	20.56	20.52	20.52
9	5040	200.5	20.51	20.53	20.5	20.53	20.63	20.6	20.51	20.51	20.52	20.52	20.45	20.45
10	5038	200.5	20.53	20.5	20.57	20.53	20.52	20.51	20.6	20.57	20.49	20.58	20.5	20.51

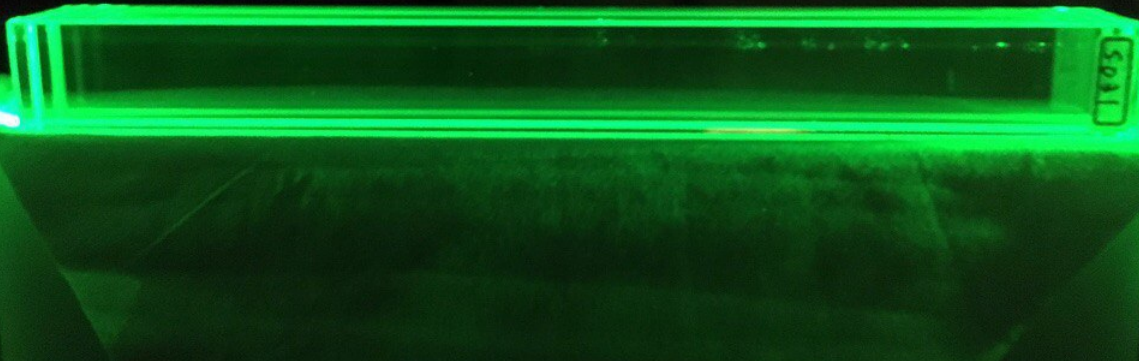
Visible defects:

- 1) Spots in the volume
- 2) Small cracks at the edge
- 3) Big crack at the edge (one crystal)
- 4) Minor scratches

**pic made for different crystals*



Visible defects with laser pointer



5031 Some dust



5032 Some dust

Visible defects with laser pointer

5033 No visual defects

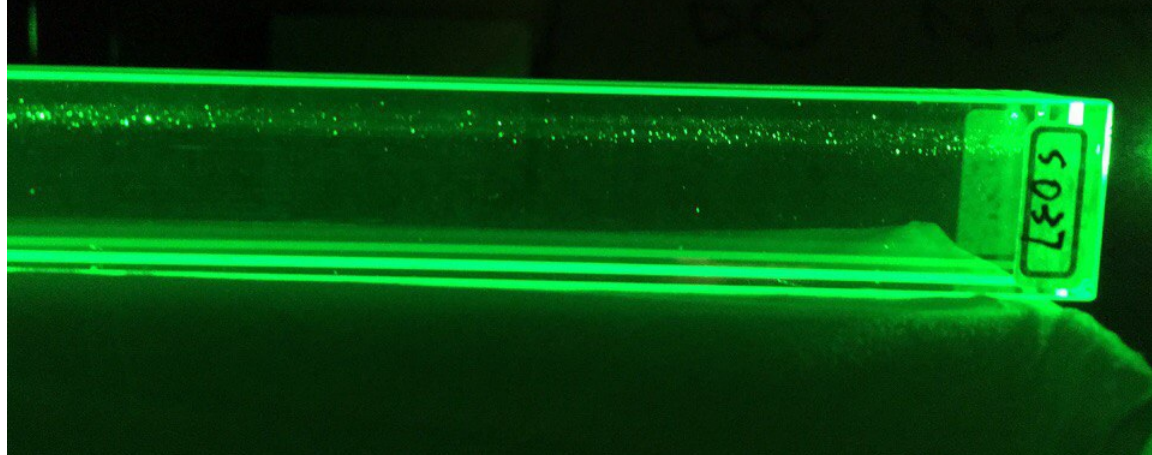
5034 No visual defects

Visible defects with laser pointer

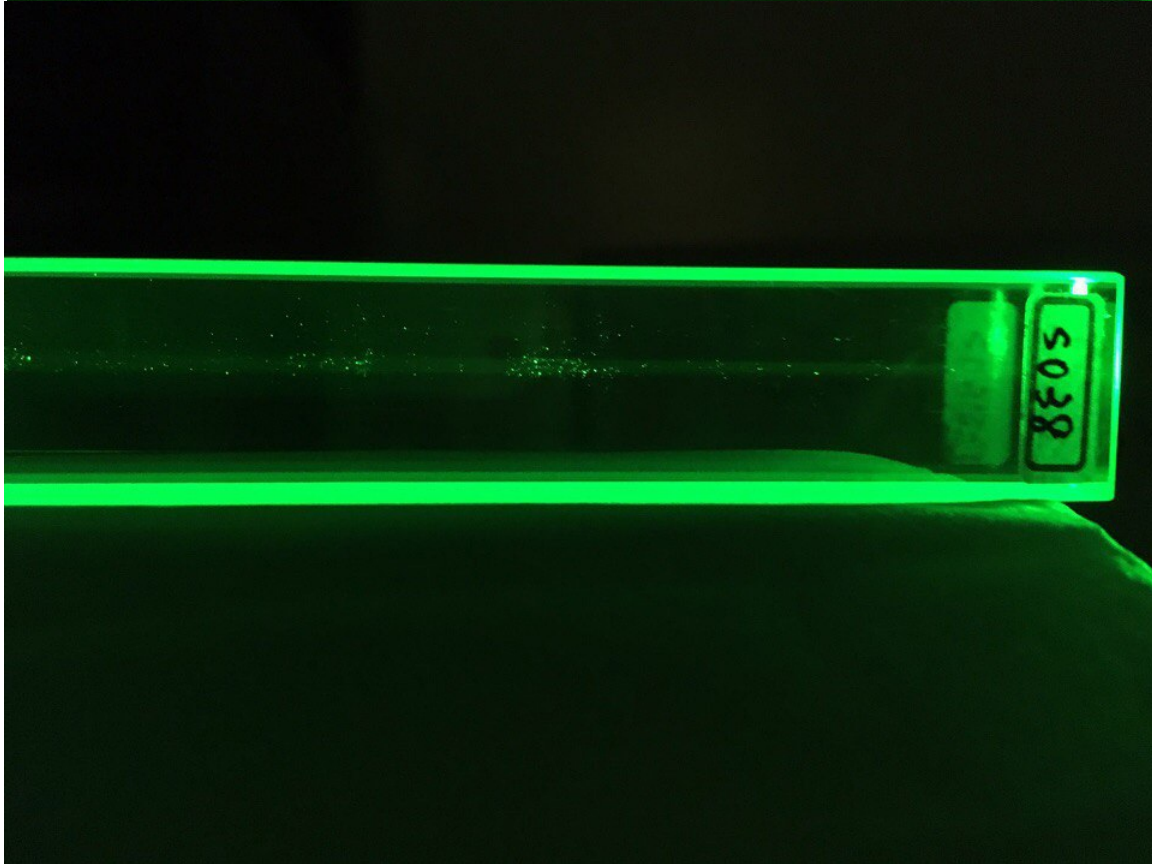
5035 Dust in the volume

5036 Dust in the volume

Visible defects with laser pointer

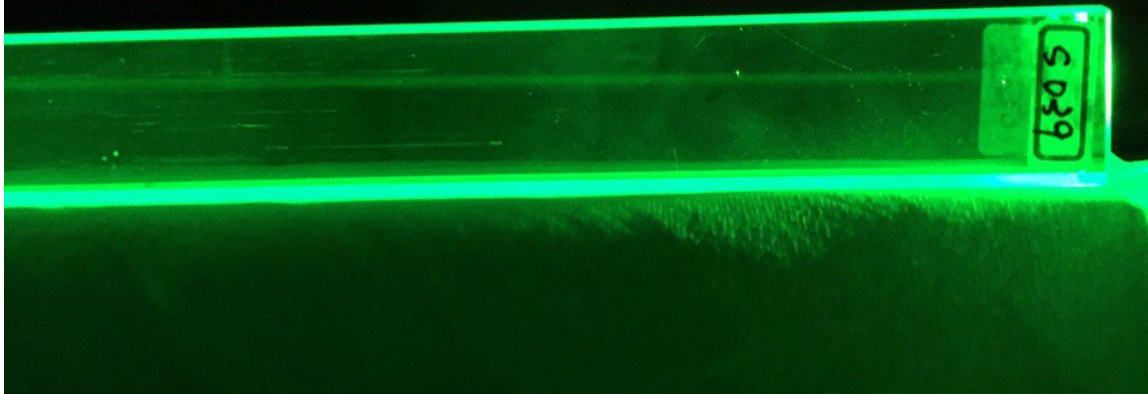


5037 Dust in the volume



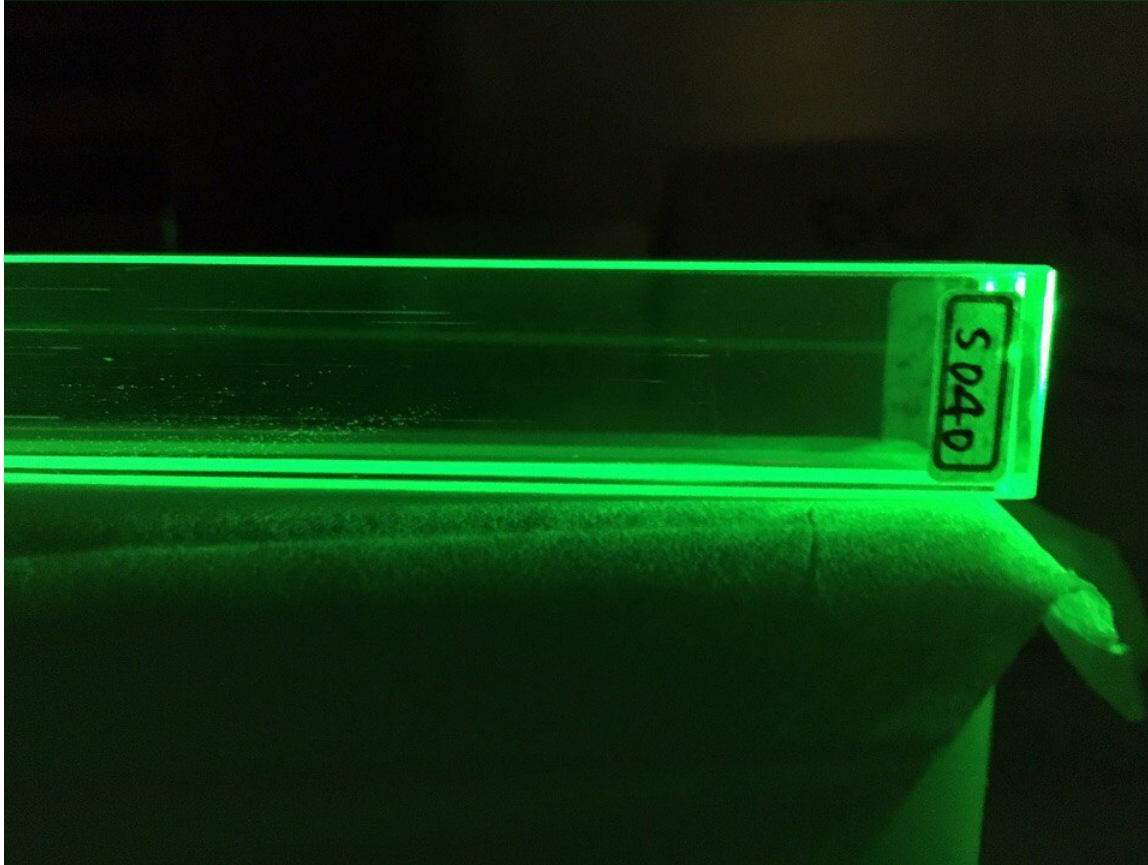
5038 Dust in the volume

Visible defects with laser pointer



5039 No visual defects

Best crystal



5040 No visual defects

Summary:

- 1) The first package arrived from manufacture, 160 crystals in 16 boxes
- 2) The crystals in box#3 have been mechanically measured
- 3) Questions for a half of the crystals from box#3 (dust in the volume, cracks)
- 4) The mechanical measurement method have been studied:

Pluses:

- cost [needed: electronic caliper (current borrowed from HallD), gloves]
- no measurements preparation needed

Minuses:

- dangerous (high probability to damage the crystal during measurements)
- takes one full business day to measure one box

! Alternative !

The setup for crystal measurements using optical system designed by Arshak and Vladimir

Pluses:

- automatic (moving platform) or manual (slide by hand)
- safe (less crystal movement)
- preliminary transmittance measurements in the same time
- same as mechanical or best precision (depends on detector sensitivity)
- easier to perform
- less time per one crystal box (?)
- most parts of the setup are available

Minuses:

- need time to figure out the final design
- cost (software; laptop; step motor setup) 1k\$ or less
Not so bad if compare to crystal 1.5k\$ (?) cost.

