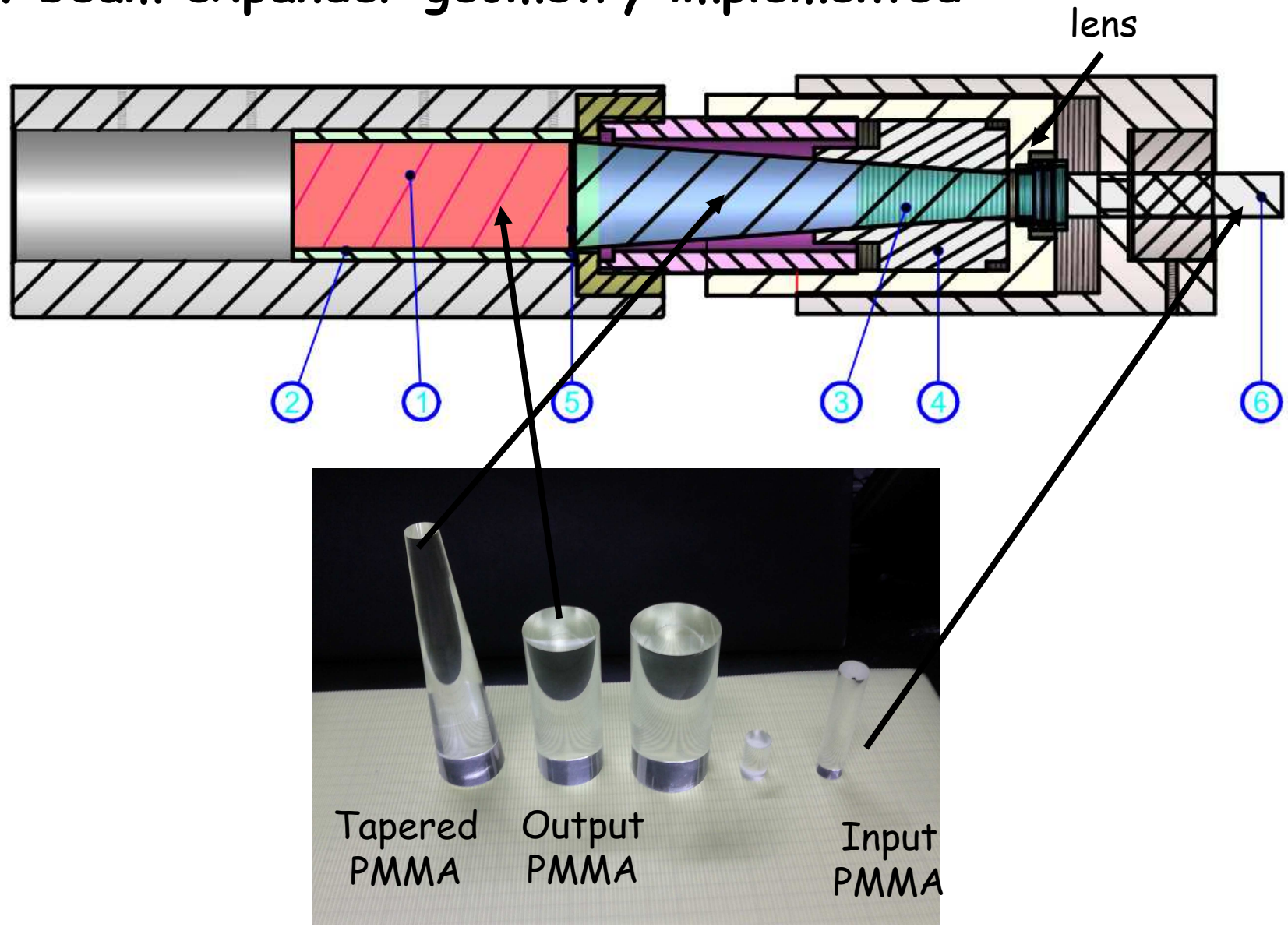
LASER ACTIVITIES in BLD 175

F. Scuri, S. Leone and A. Blanco

6-05-2013 -> 17-05-2013

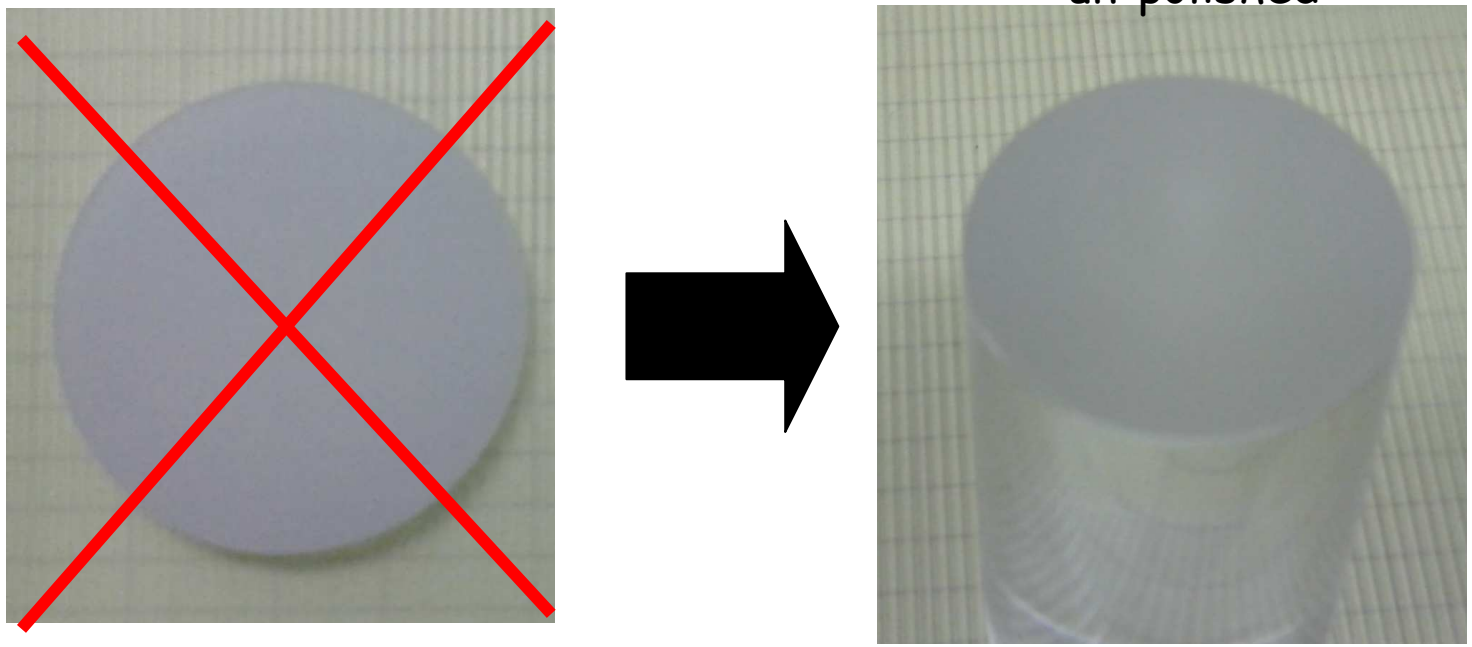
New beam expander geometry implemented



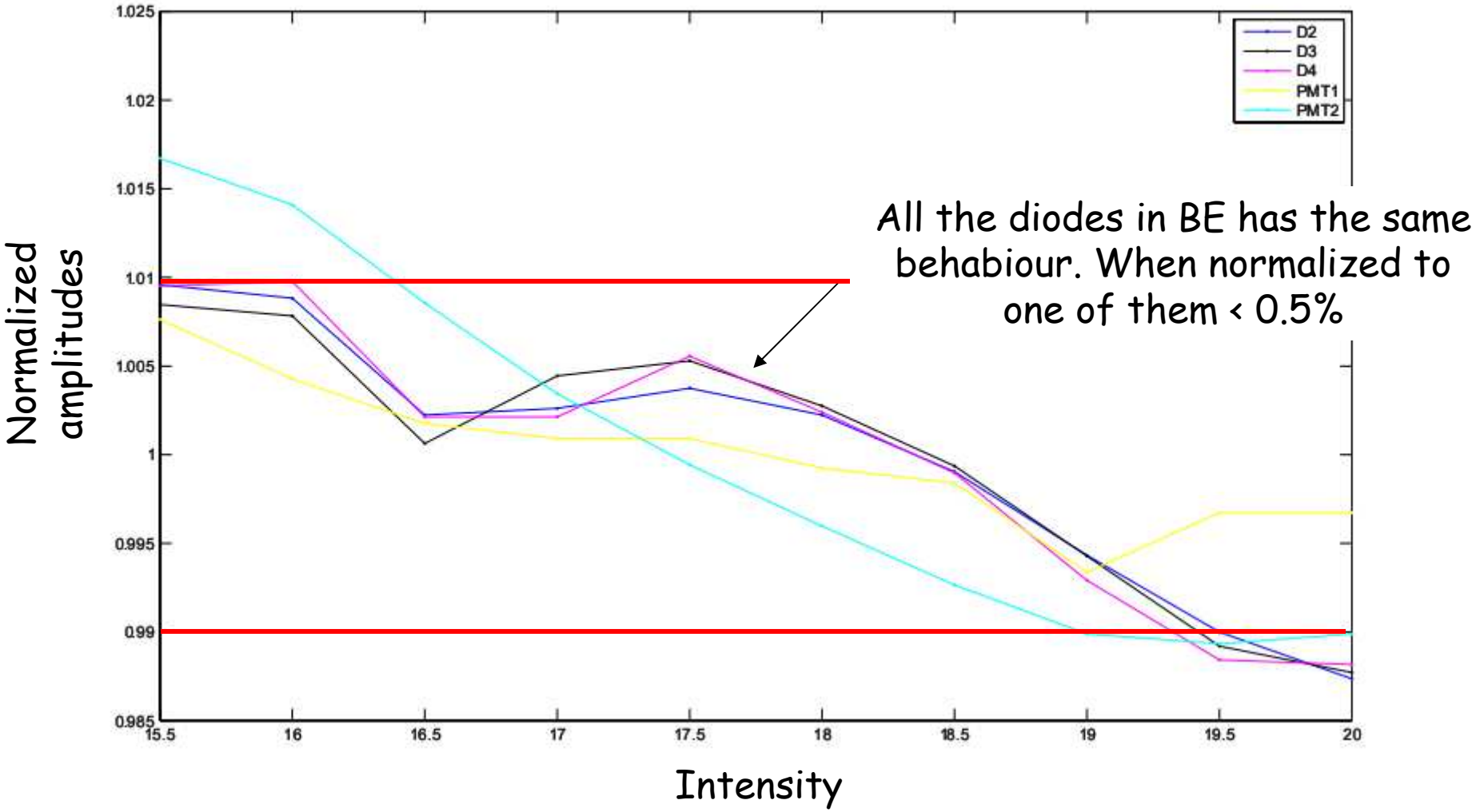
No air gaps in the light path => increase on the light transmission

Diffusers

We have found that **what matters concerning stability is the number of unpolished surfaces**, therefore we have **removed** some of the **internal diffusers by un-polishing the internal PMMA surfaces** => simplest system.



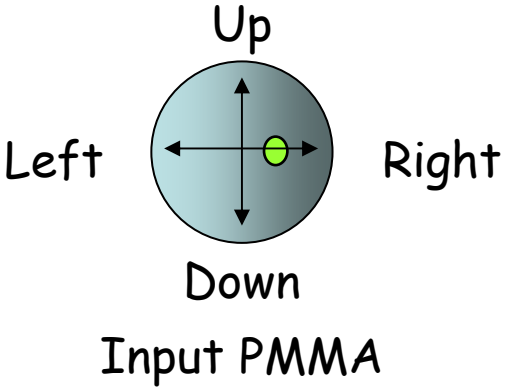
Stability as a function of intensity.

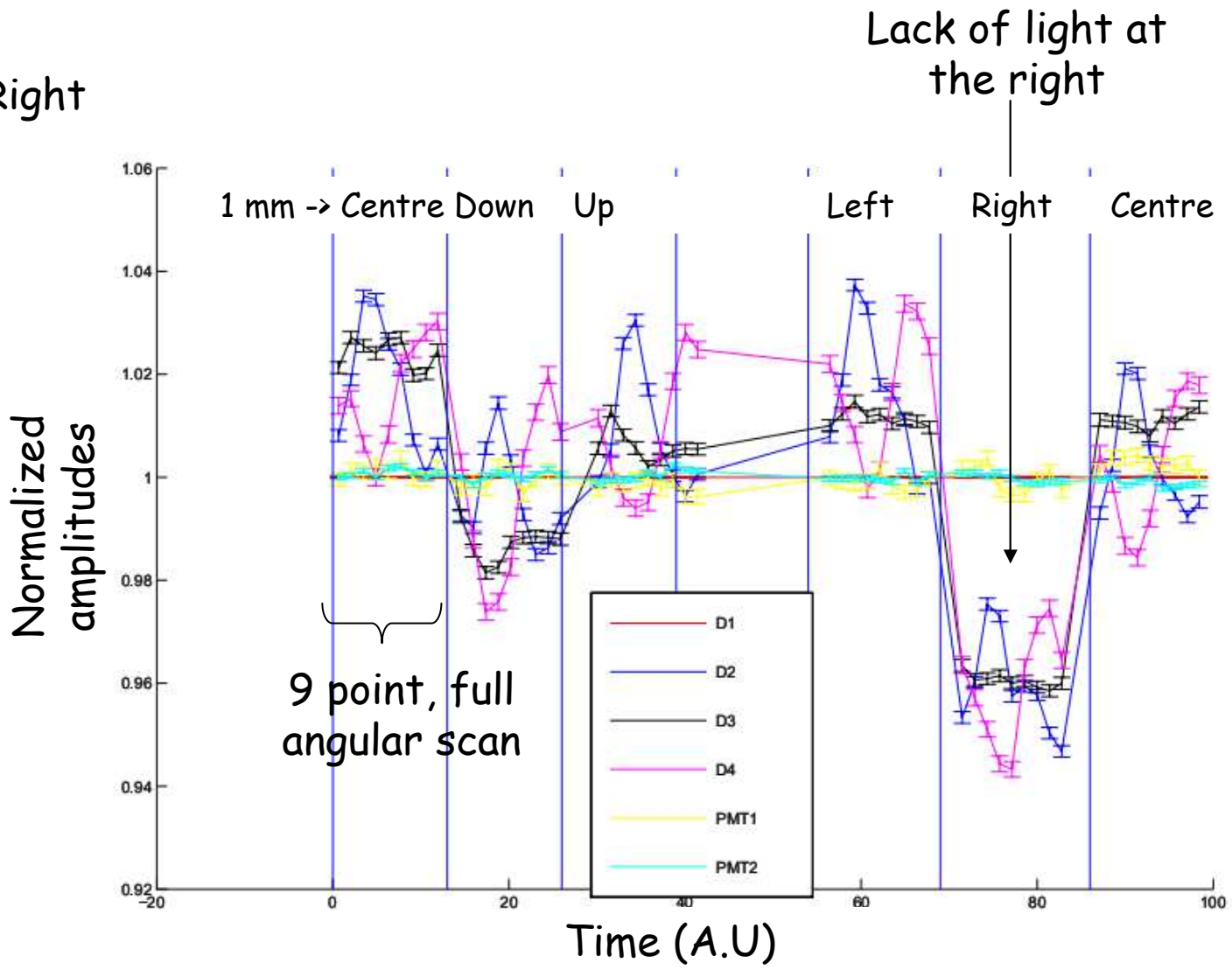


Daily intensity scans are performed. Fabrizio is working on the calibration procedures based on statistic to retrieve the # photos / ADC channel.

Pointing effect. Input surface

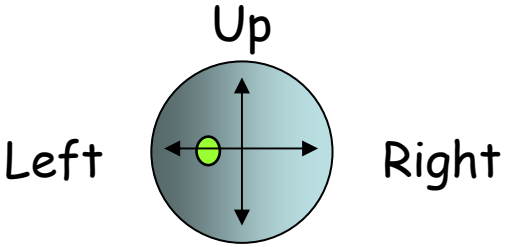
Effects crated into the transmitted light and its uniformity at the output of the BE due to modification of the laser beam input point.





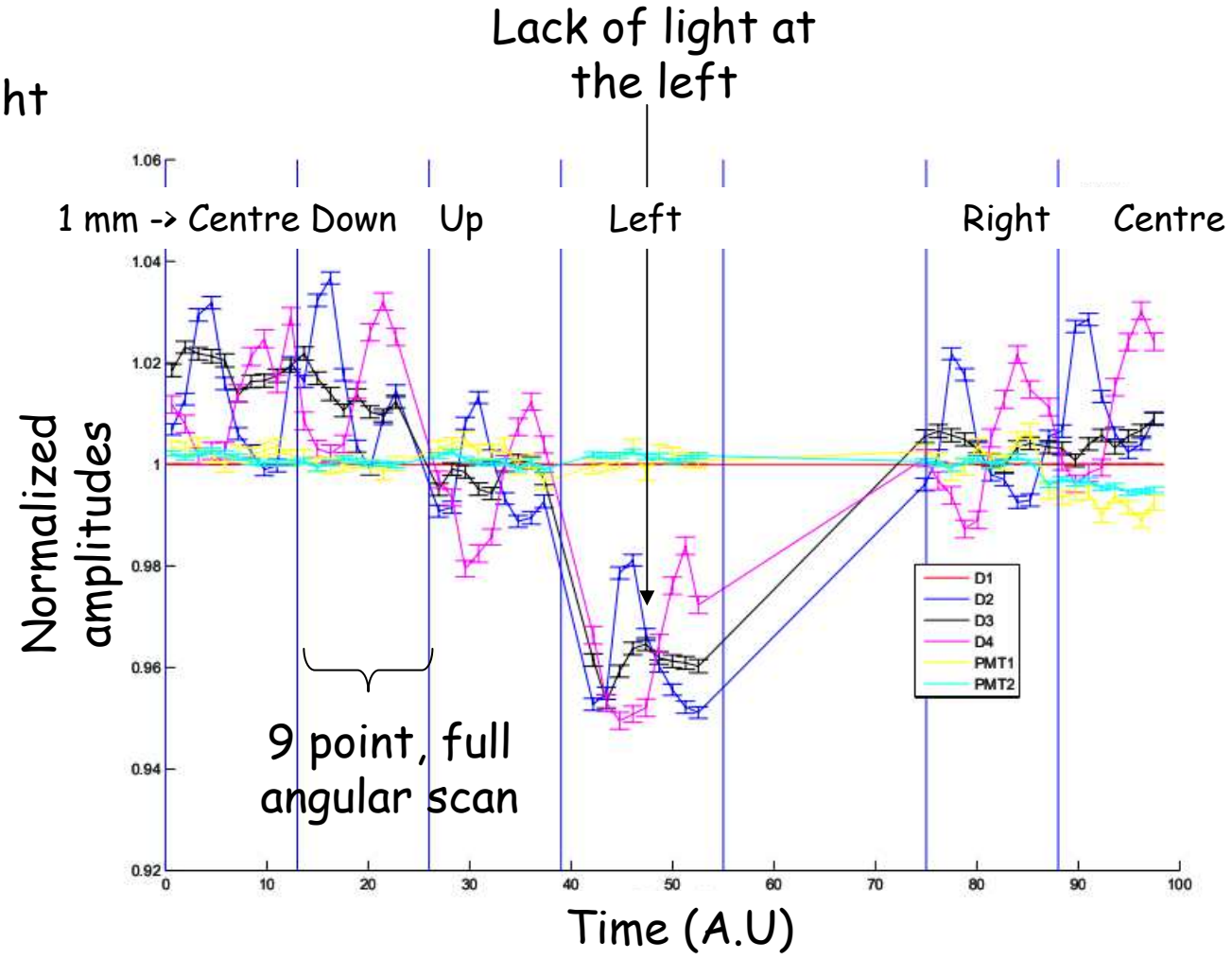
Pointing effect. Input surface

Effects crated into the transmitted light and its uniformity at the output of the BE due to modification of the laser beam input point.



Input PMMA

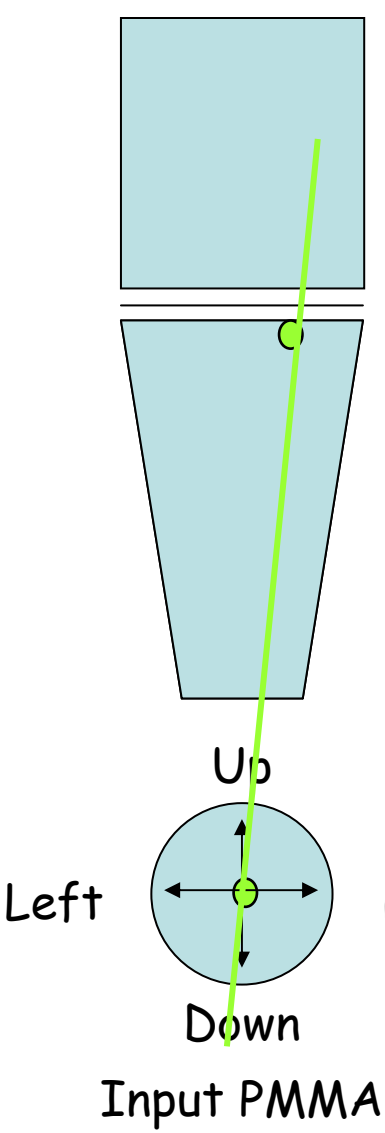
Input PMMA rotate by 180°C

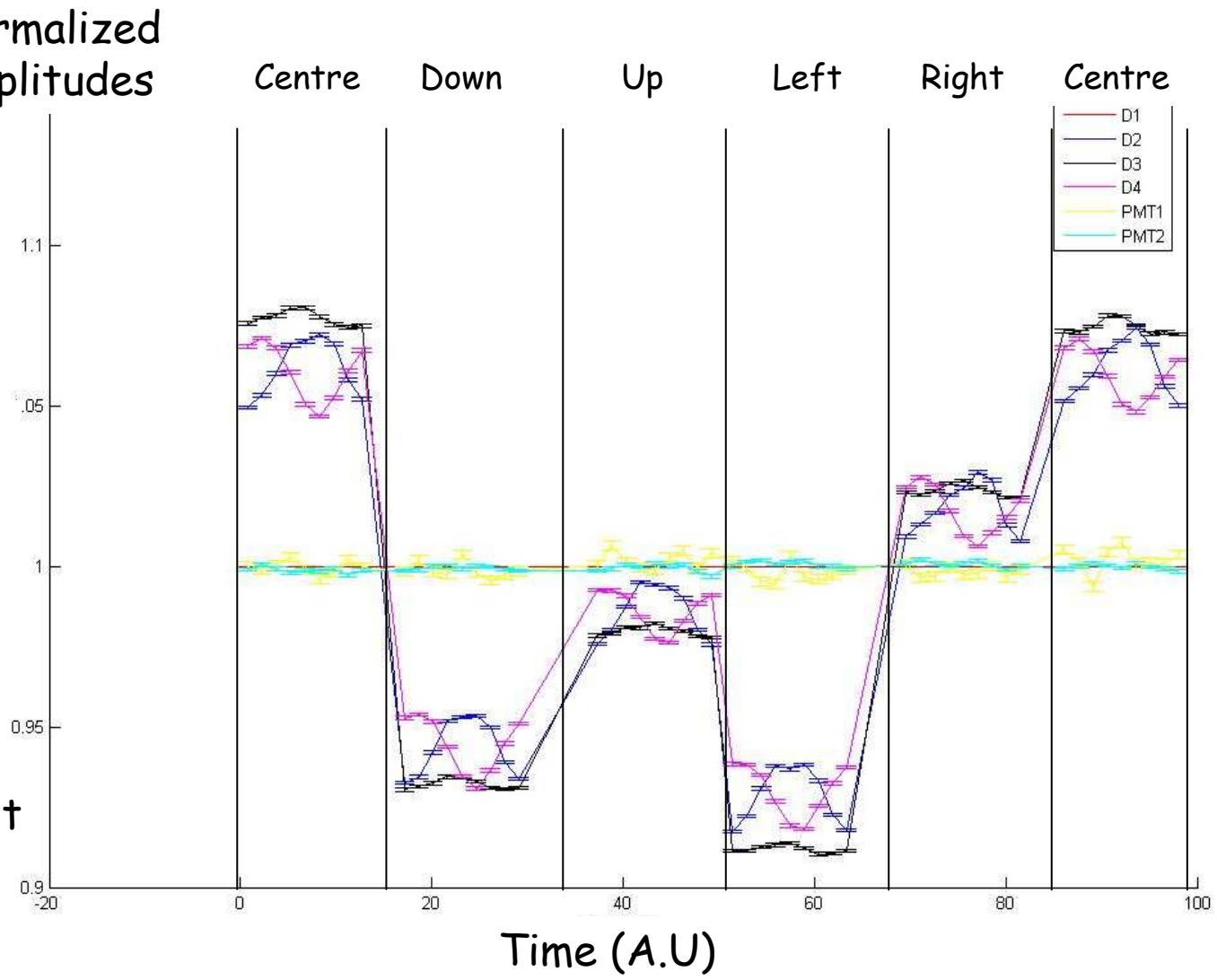


Meanwhile solved by re-oplishing the input PMMA

Pointing effect. Importance of mechanics

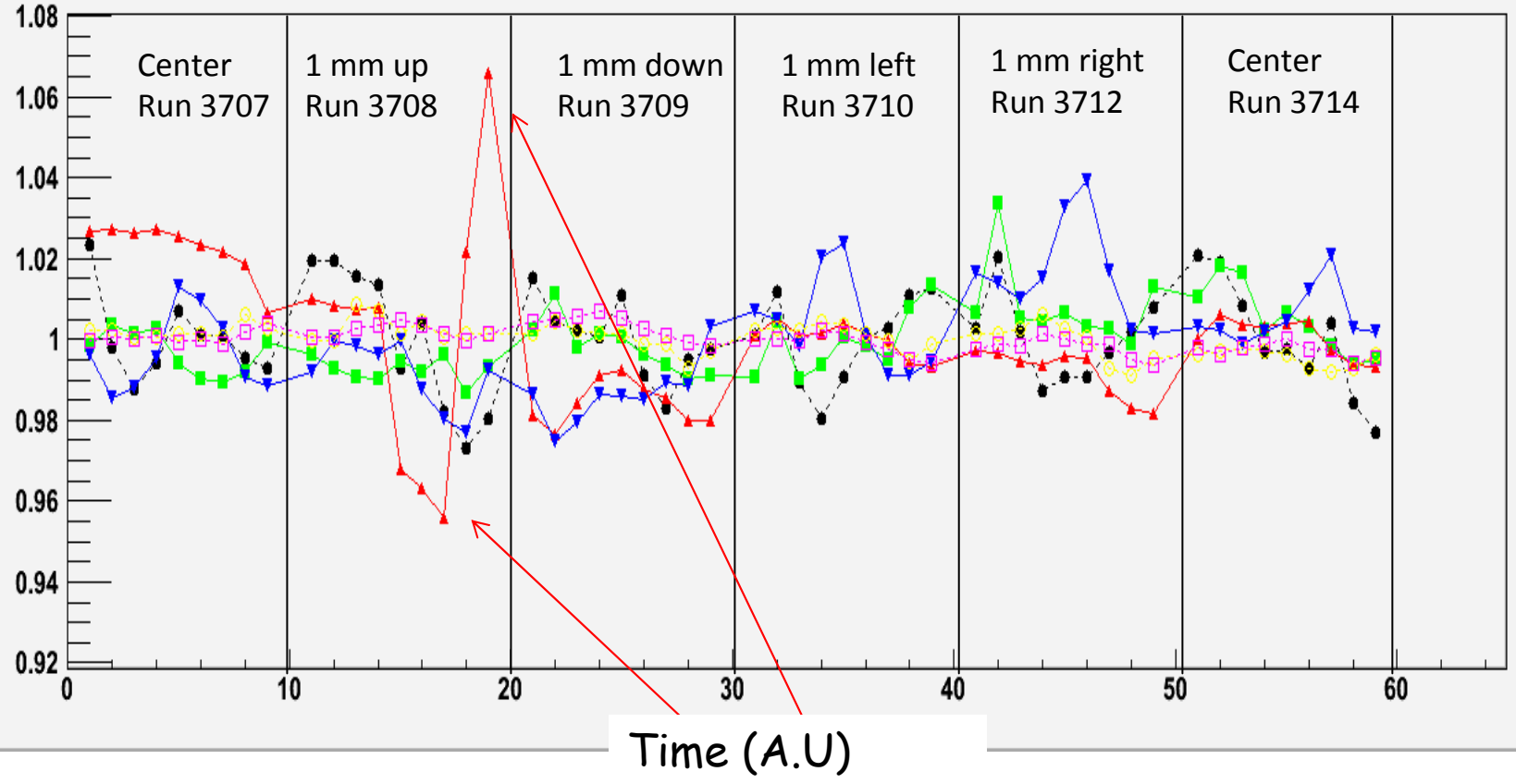
Beam expander **missaligned** completely. Strong effect > 5%. **Mechanics is very important**





Pointing effect. Finally

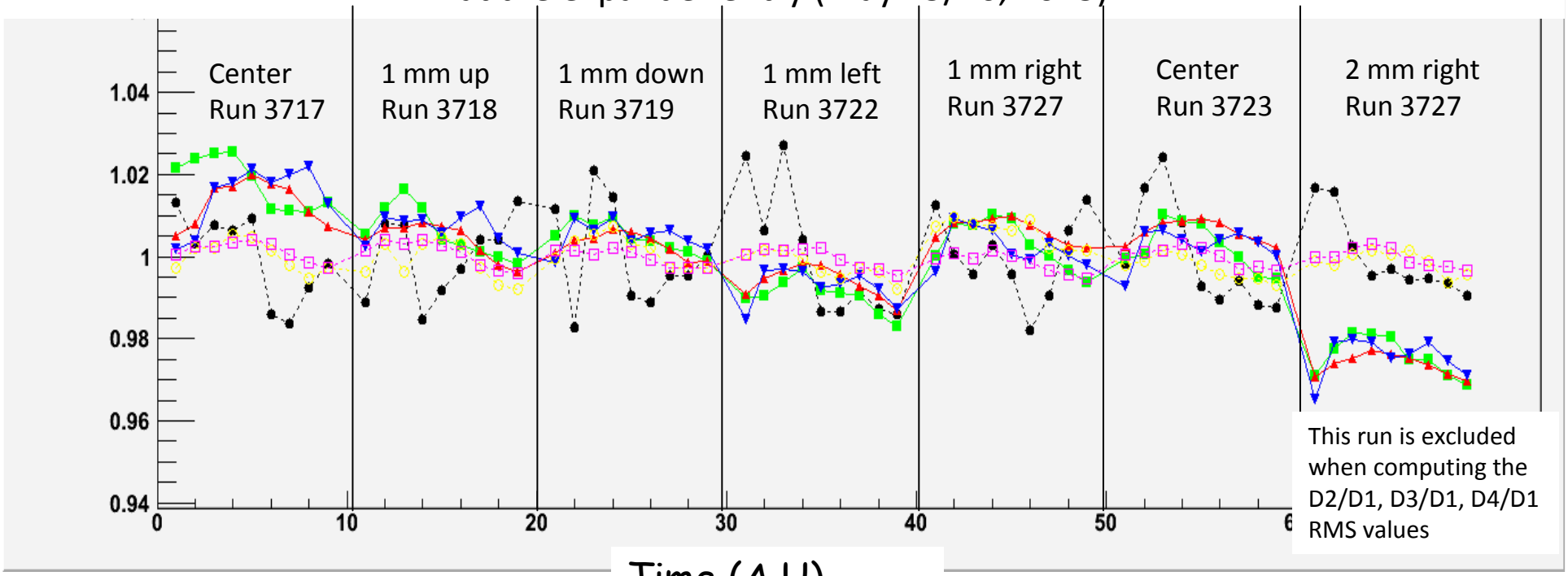
Angular scans (9 point each) with the default geometry after **re-allignment** (May 15, 2013)



Laser stability (black line, 3 hours, D1 is normalized to its average): RMS < 2%
Normalized monitors (PMT1 (yellow) and PMT2(pink)) very good: RMS < 0.5%
Central fiber (D3, red) : RMS < 2% (but a strange fluctuation never seen before or after)
Fibers on the border of the exit PMMA (D2, blue - D4, green) : RMS < 2%

Pointing effect. Improve on stability at a cost of light

Angular scans (9 point each) with the addition of a 2 unpolosihed face PMMA light-guide at the expander entry (May 15/16, 2013)



Laser stability (black line, 3 hours, D1 is normalized to its average): RMS < 2%

Normalized monitors (PMT1 (yellow) and PMT2(pink)) very good: RMS < 0.5%

Central fiber (D3, red) : RMS < 1%

Fibers on the border of the exit PMMA (D2, blue - D4, green) : RMS < 1.5%

…. But a factor about 7 lost in absolute intensity due to a huge amount of light scattered back from the first unpolished surface(s)

Visit to USA 15

- Some space available here and lot of space in other rack.

-We should start as soon as possible a discussion about the construction of the new system

-AIM: Install a replica of the new system in BLD175 before installation in USA 15 as soon as possible