

Grusenick repetition of Michelson-Morley interference experiment

- Posted by [Sepp](#) on December 13, 2009 at 3:30am
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I have previously posted Martin Grusenick's repetition of the Michelson-Morley interference experiment with a new twist (vertical rotation instead of horizontal) in the video section.

<http://worldnpa.ning.com/video/extended-michelsonmorley>

Previously, I had posted on the experiment on my physics-and-economy blog at

http://blog.hasslberger.com/2009/09/extended_michelsonmorley_inter.html

Both of those postings have attracted several comments which I, not being the experimenter, have some trouble answering and which Martin, not speaking English very well, is not reacting to either. But there is some more information, which I would like to post here.

There were several commenters who said his apparatus was not stable enough to exclude that material strain, induced by the influence of gravity during the vertical rotation of the experimental apparatus, produced the observed shifting of interference patterns.

Martin has repeated the experiment with a much stiffened set-up and here are the results he obtained, in his own words, as well as in several pictures.

"I have read your data with much interest. Many people say that my construction is mechanically too unstable, and that gravity influences my apparatus. So I built another one. A man named Norbert Feist provided me with better optical equipment to use. The new interferometer is only a steel plate with 189mm diameter and 8mm thick. The mirrors and the mirror holders are manufactured by Edmund, USA. Their beam splitter however is mechanically too unstable, so I used the one I made myself.

The interference pattern is projected on a small piece of paper. During a 180° rotation with the new Interferometer, I can see on average 1.5 interference fringe shifts during the night and 2.0 during daytime. With the older one, which you can see in the YouTube movie, there are 11.0 shifts at night and 11.5 if the experiment is performed during daytime. So, both Interferometers (the older and the newer one) show a difference of 0.5 interference fringe shifts between day and night.

I also would like to mention that a slight variation in the strength of the fringe pattern movement occurs during different days of the month. On Thursday 16.10.2009 at 24.00 o'clock, I could see a full 3.0 interference fringe shifts per 180° rotation (with the new interferometer).

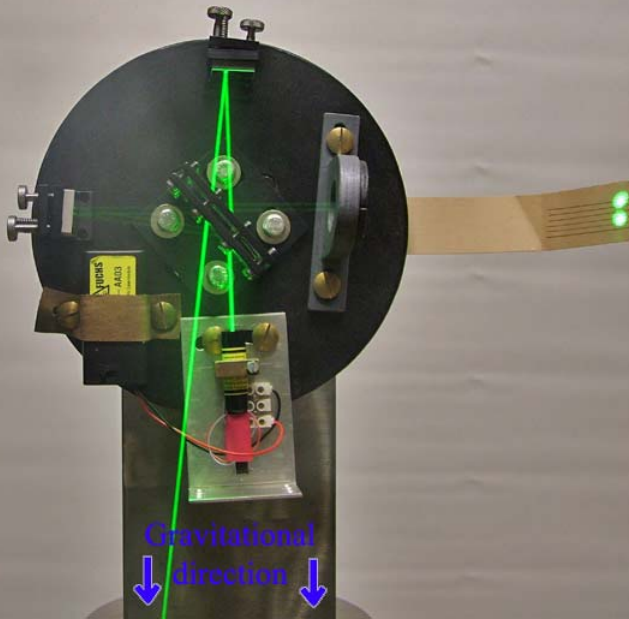
The zero point, where a standstill of the pattern movement happens, is for both interferometers at the same position. There are two zero points in a 360° rotation of both interferometers when the beam splitter is positioned horizontally to the earth's surface.

To all people who say that the only influence on the interferometer is gravity, I have a simple question. Why is there no zero point or stop of the fringe pattern movement when the beam splitter is in the vertical position? In the beam splitter's vertical position, the mirrors and the mirror holders are symmetrically pushed by gravity. But there is no zero point."

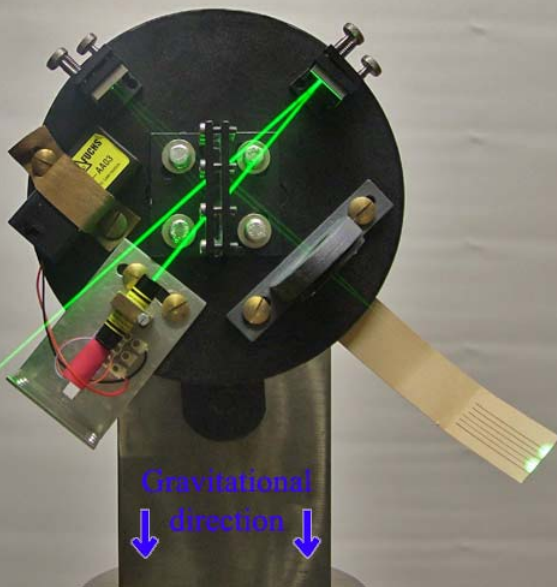
Here are Martin's images of the new set-up and some of the old one, for comparison.

First, a series that shows what happens during one full 360 degree rotation.

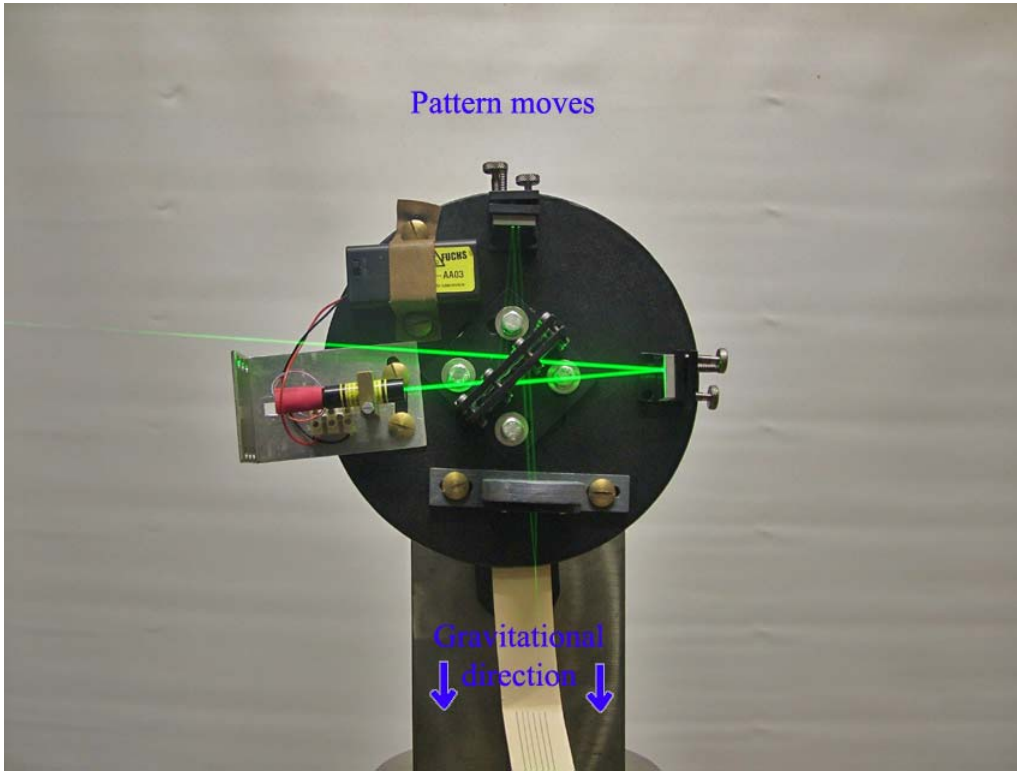
Pattern moves



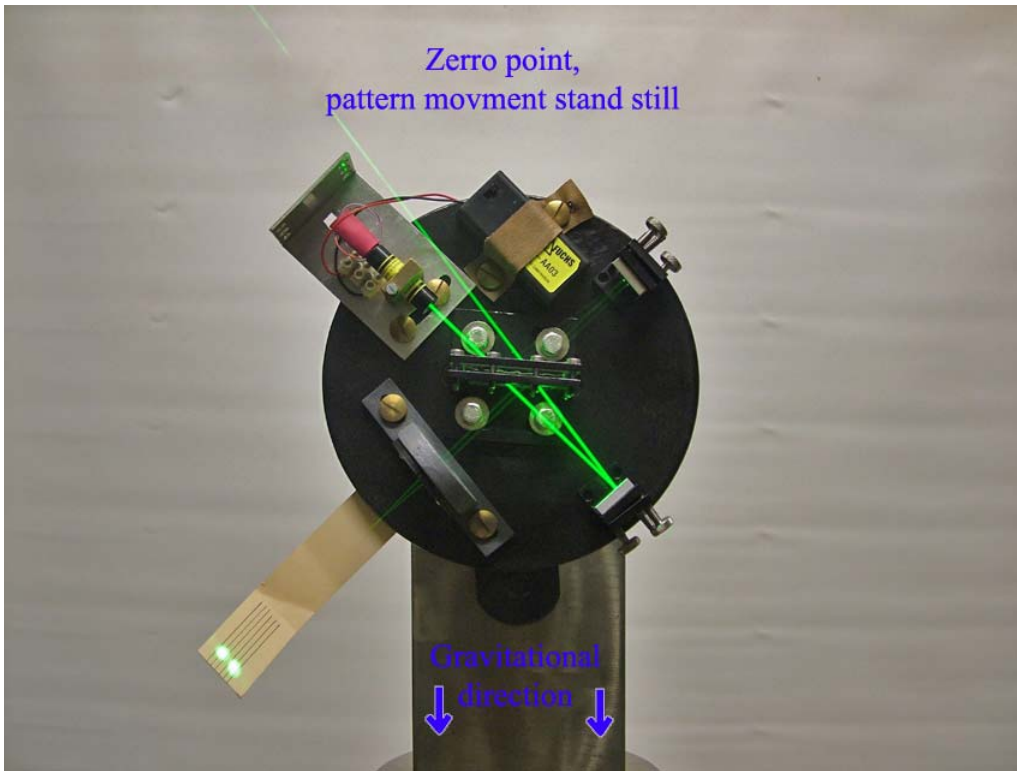
Pattern moves, why no zero point in this position?



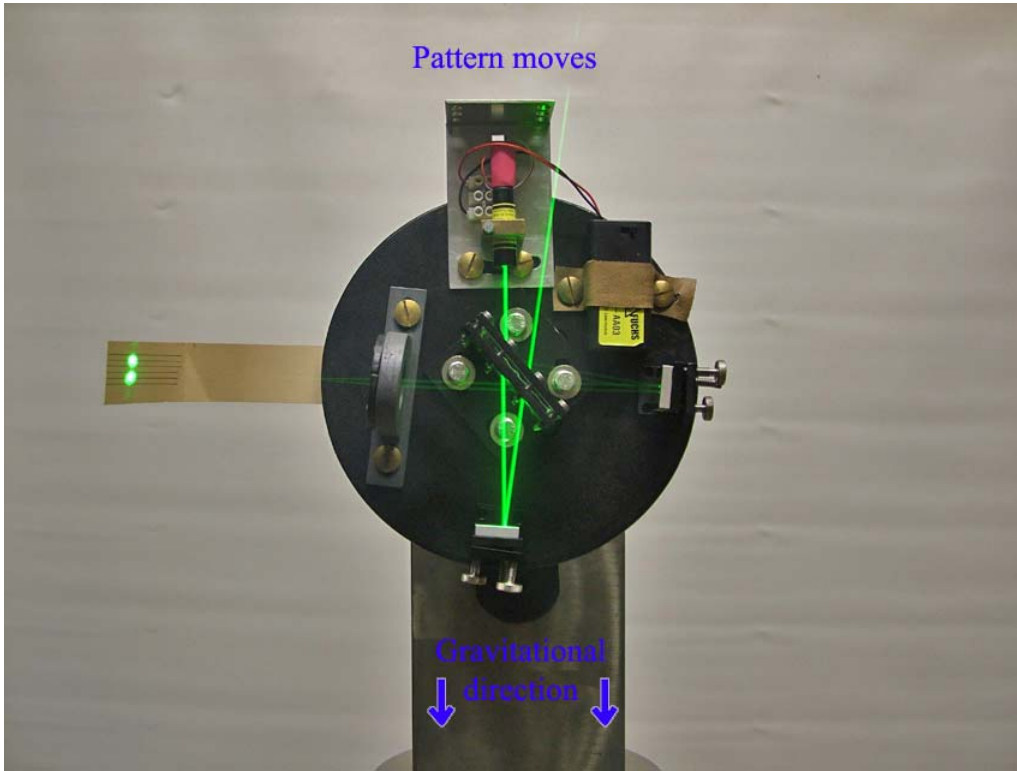
Pattern moves



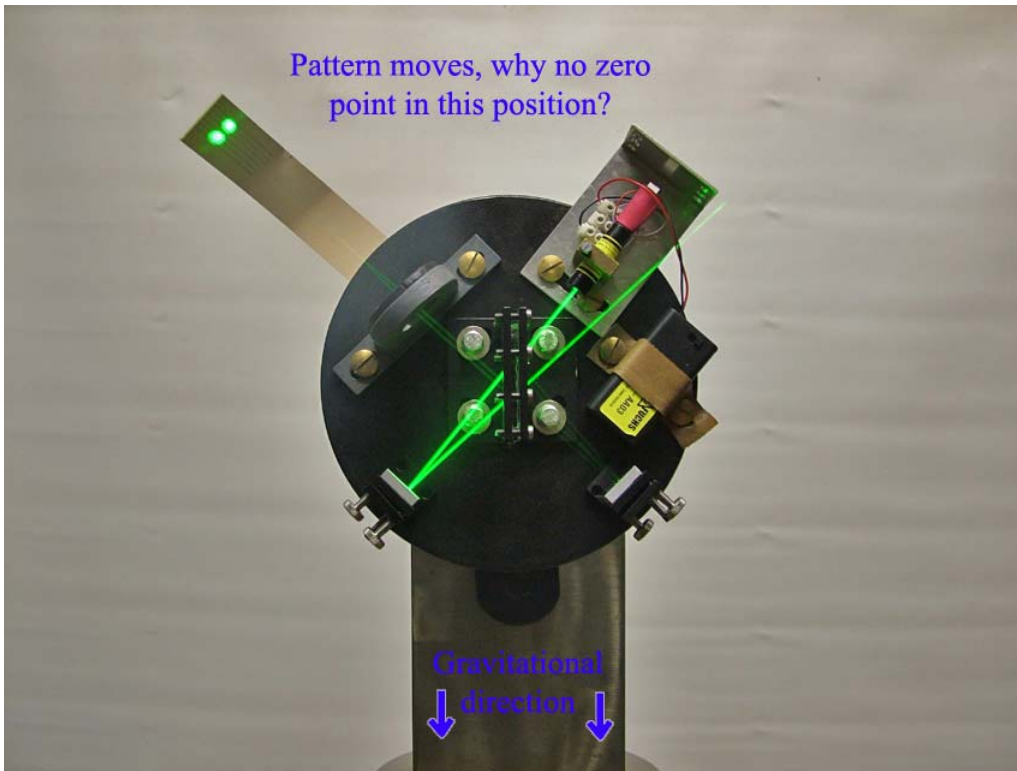
Zerro point,
pattern movment stand still

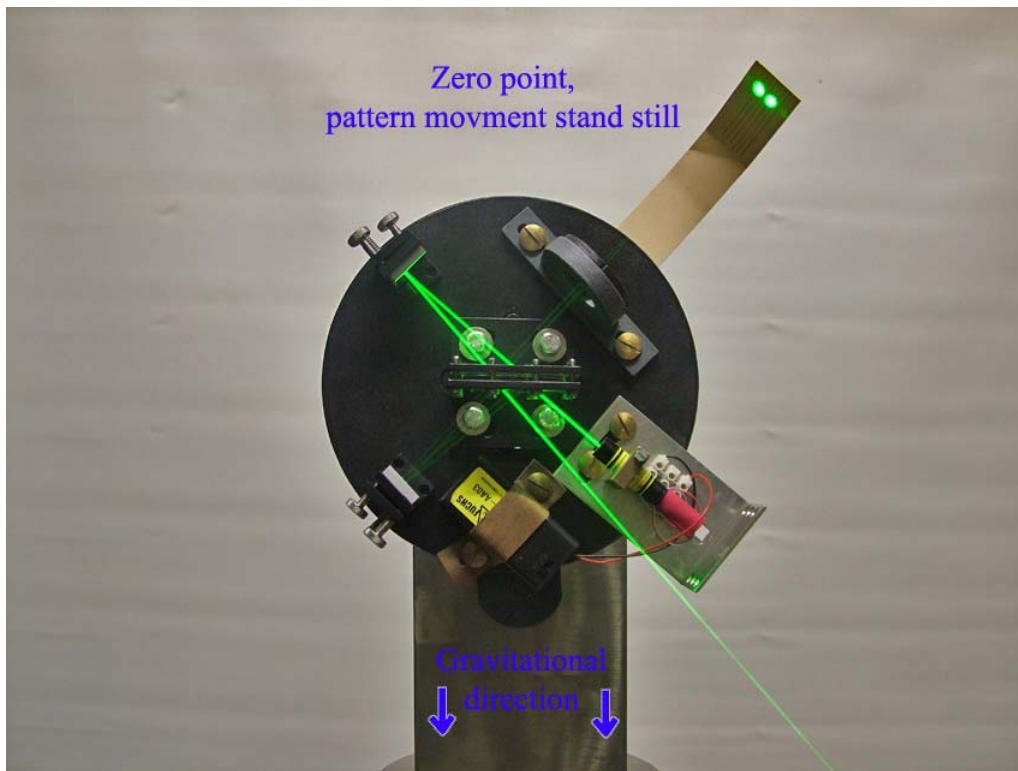
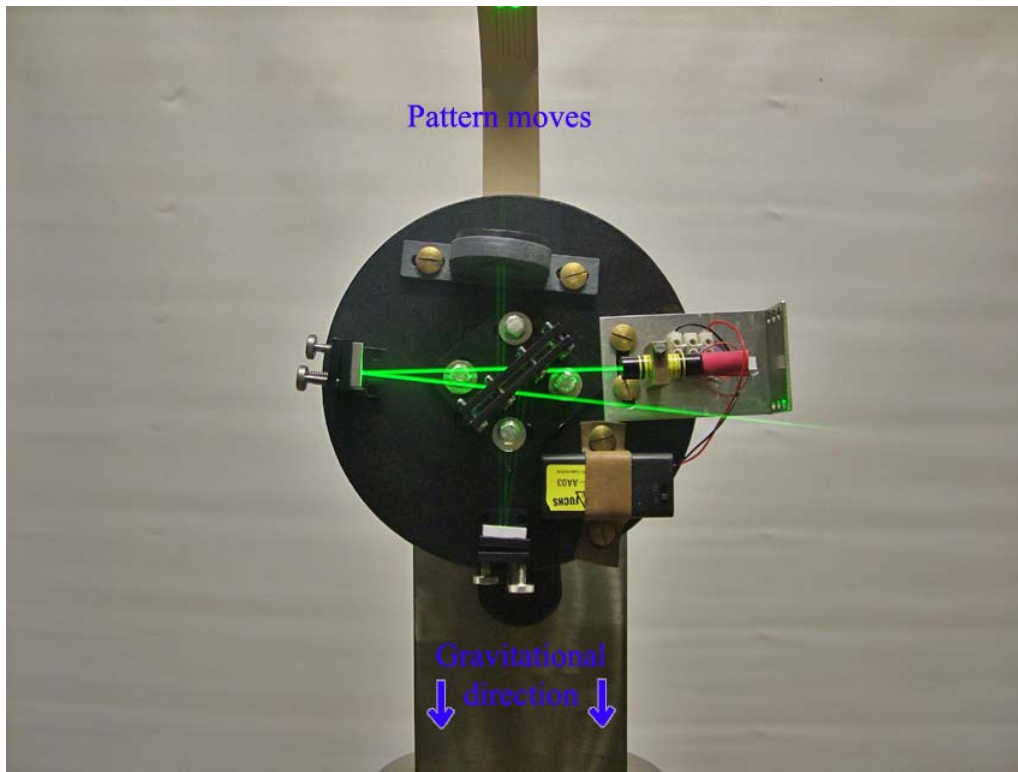


Pattern moves



Pattern moves, why no zero point in this position?

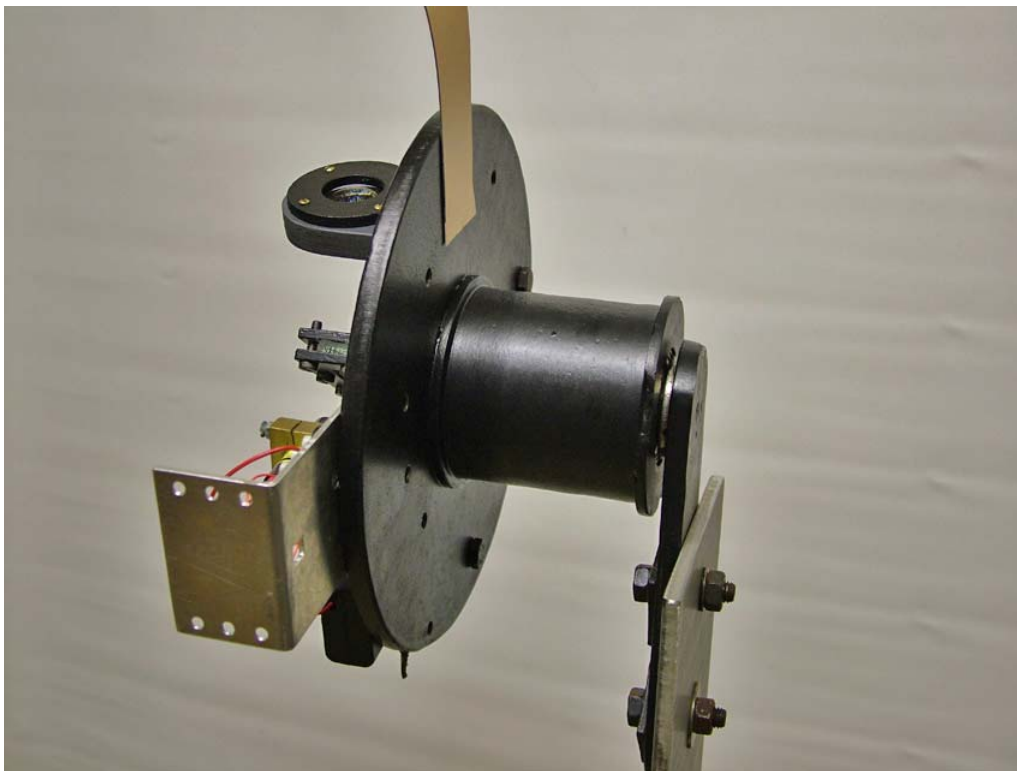




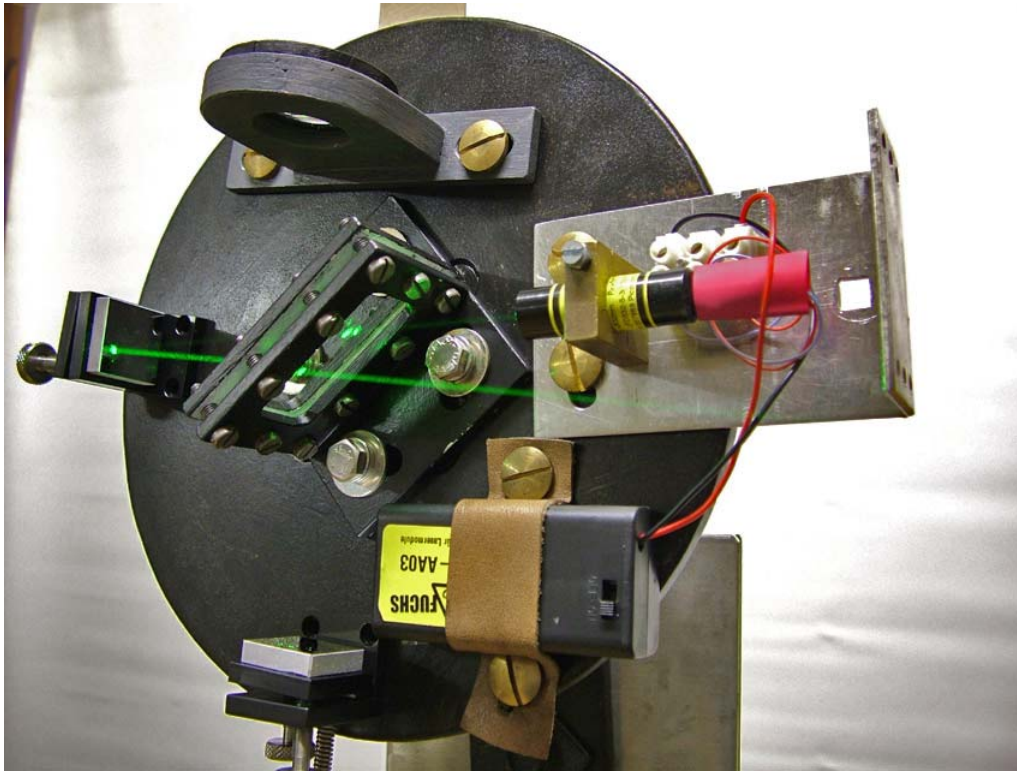
The mounting of the experimental set-up:



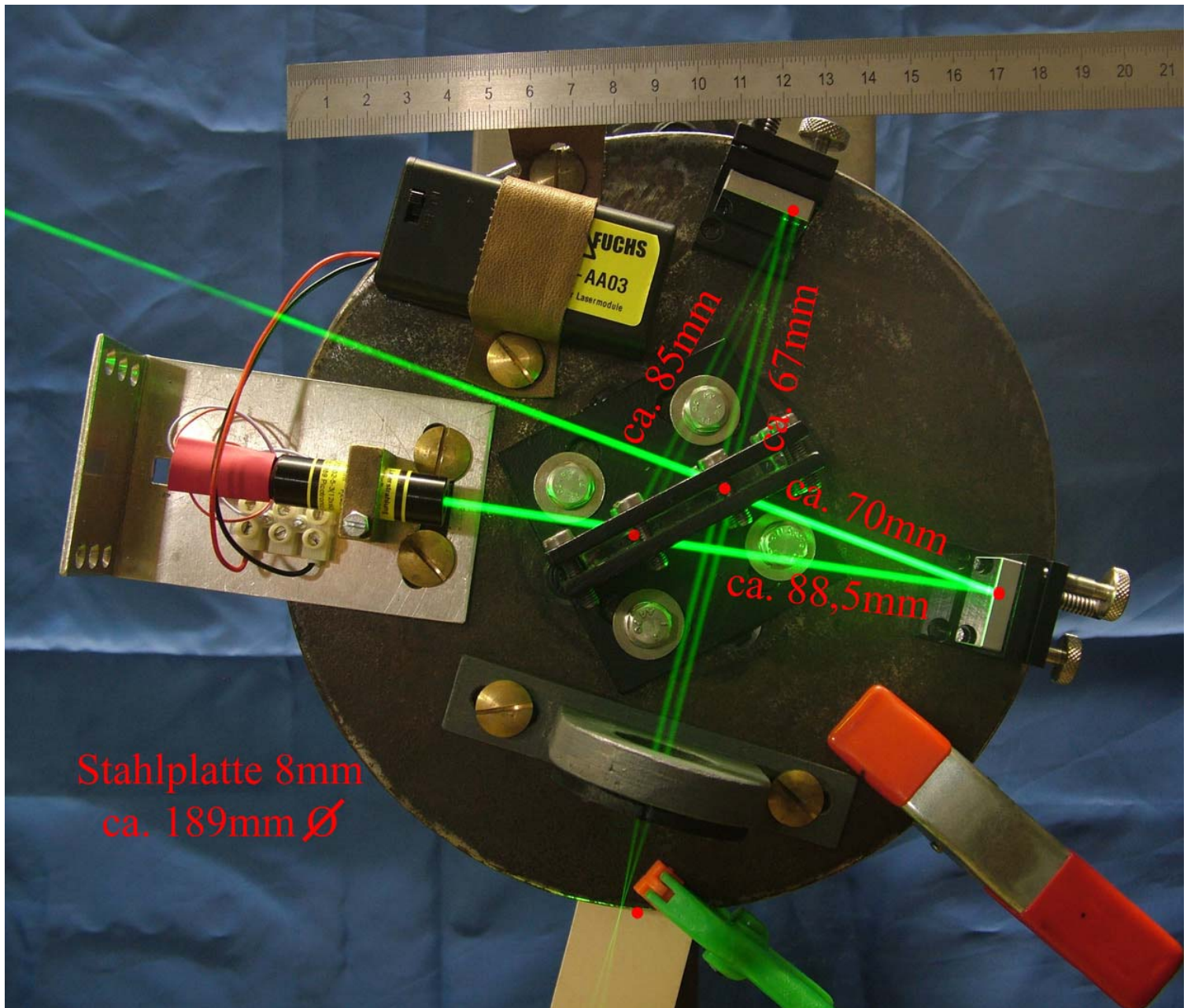
Detail:



Front view:

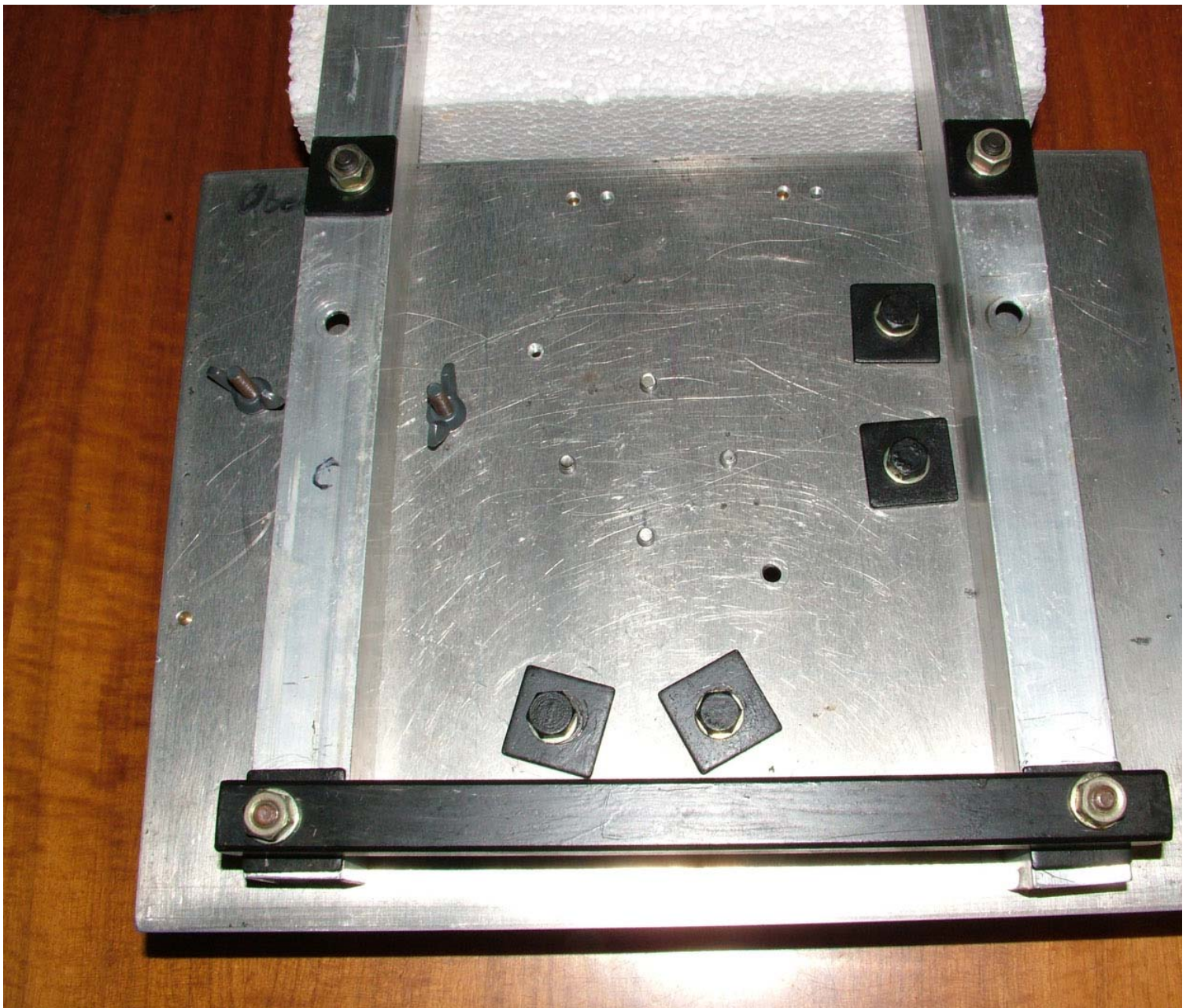


The experimental set-up with some measurements:

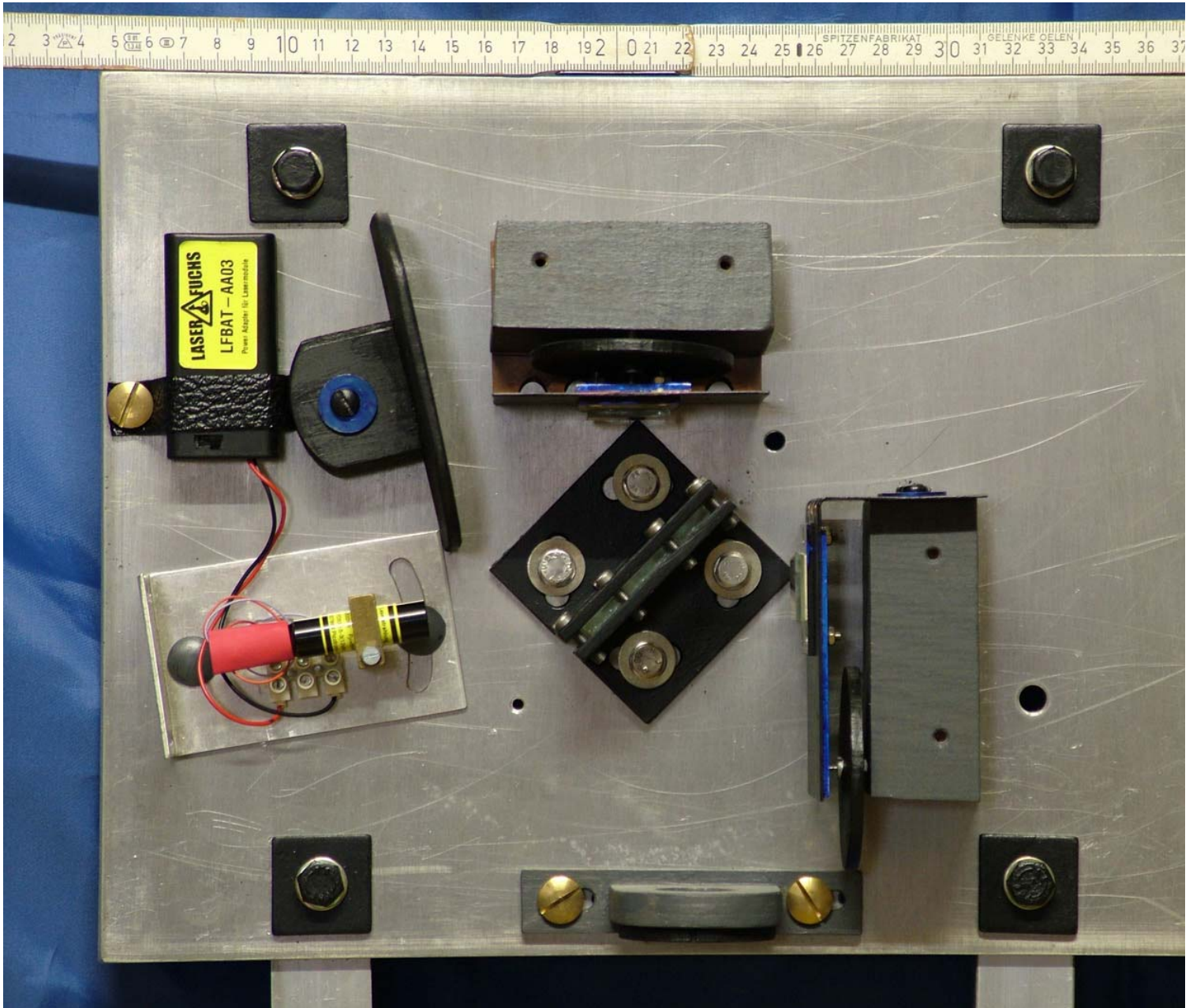


And here are, for comparison, some images of the first experimental set-up, the one shown in the YouTube video linked in the first posts.

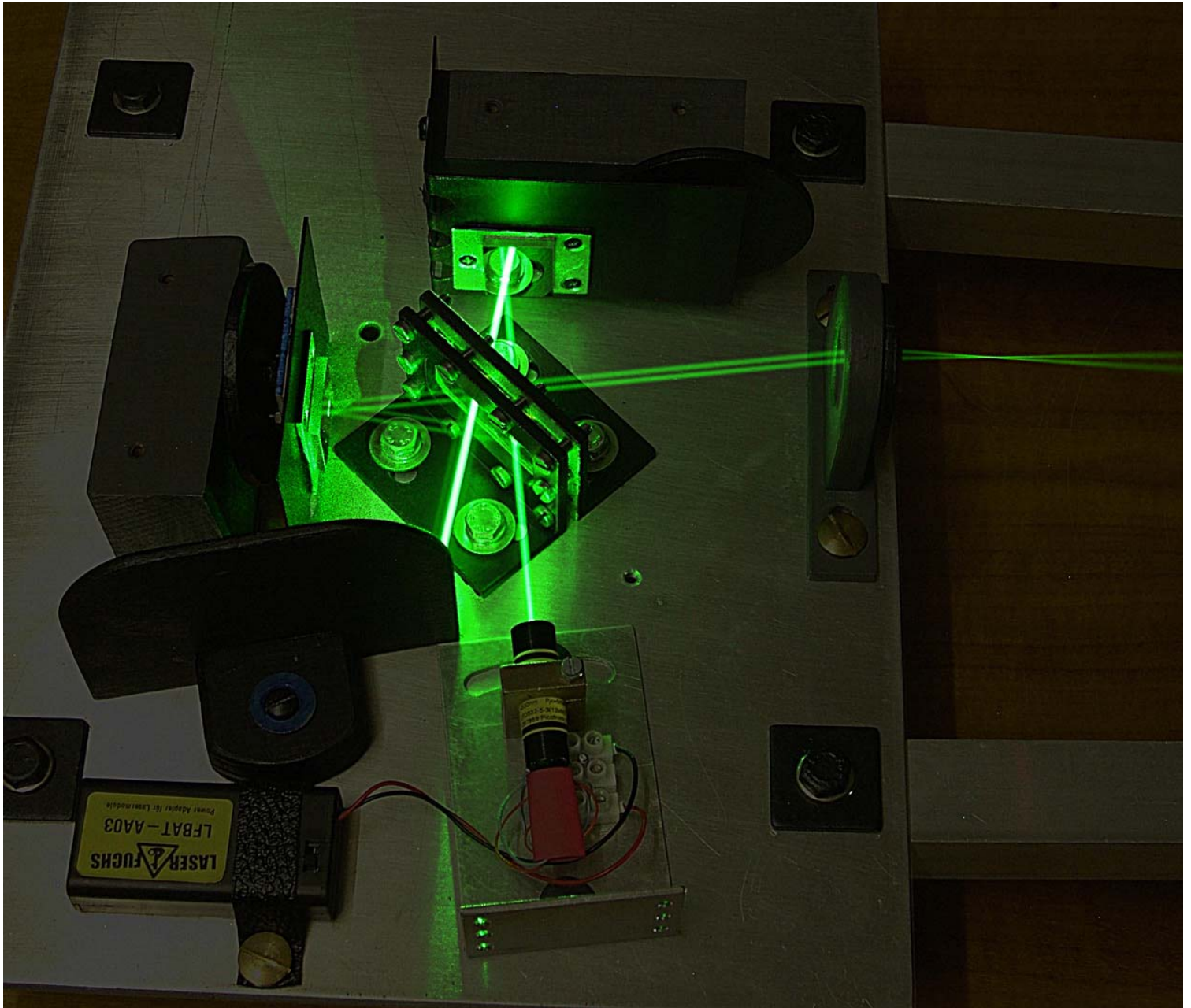
The aluminium mounting plate, seen from back:



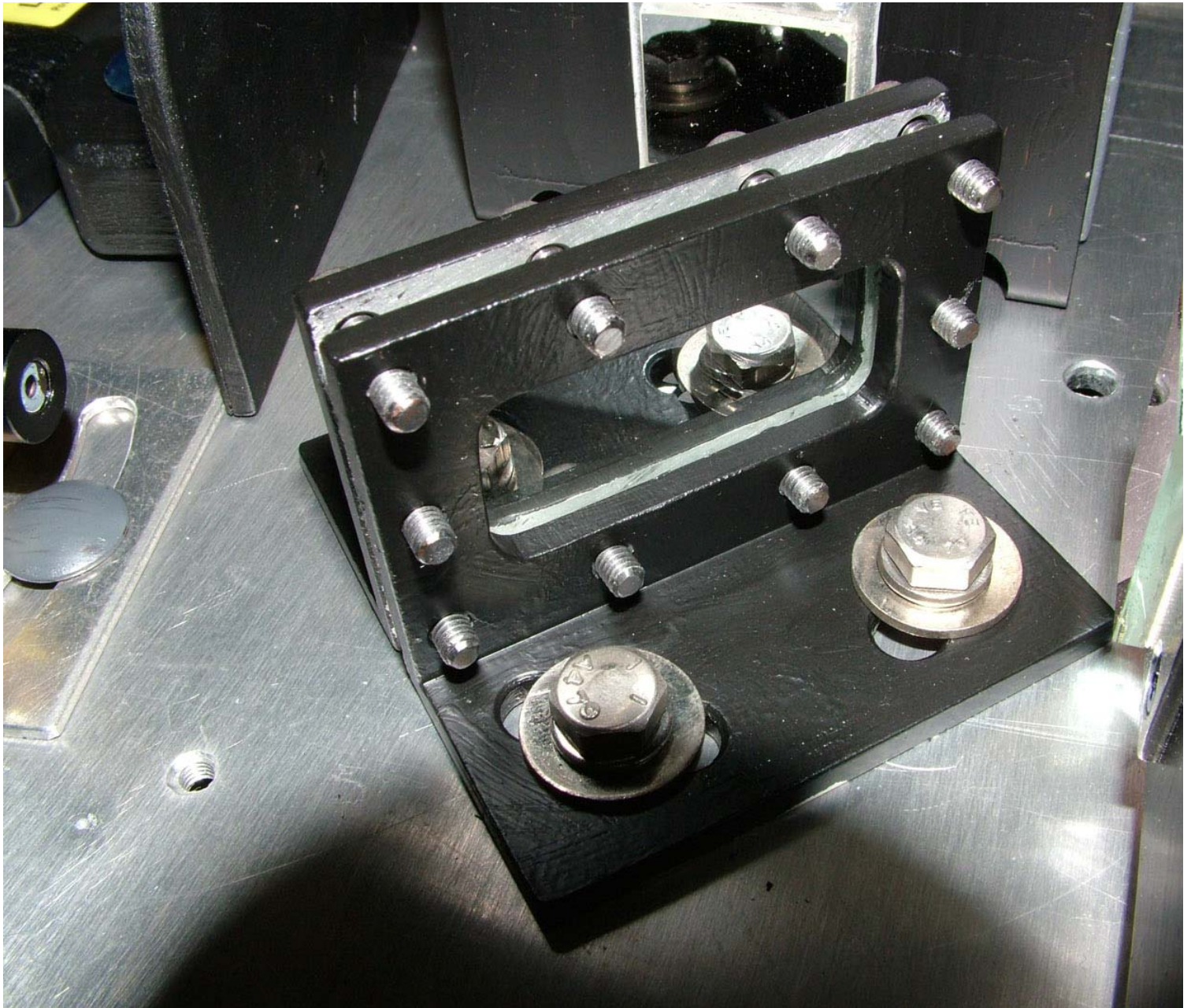
Old experimental set-up as mounted on aluminium plate:



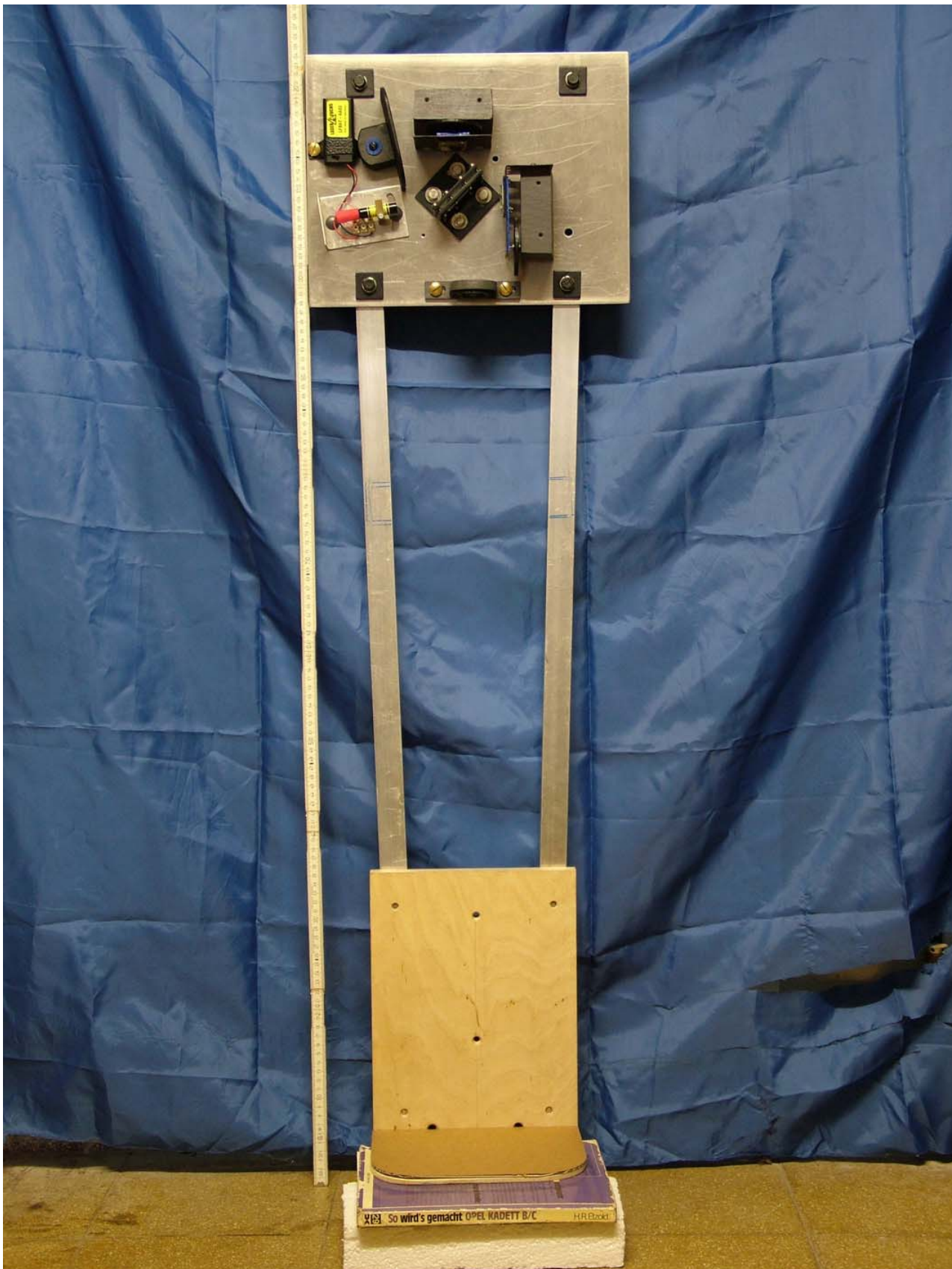
Path of the luminous beams:



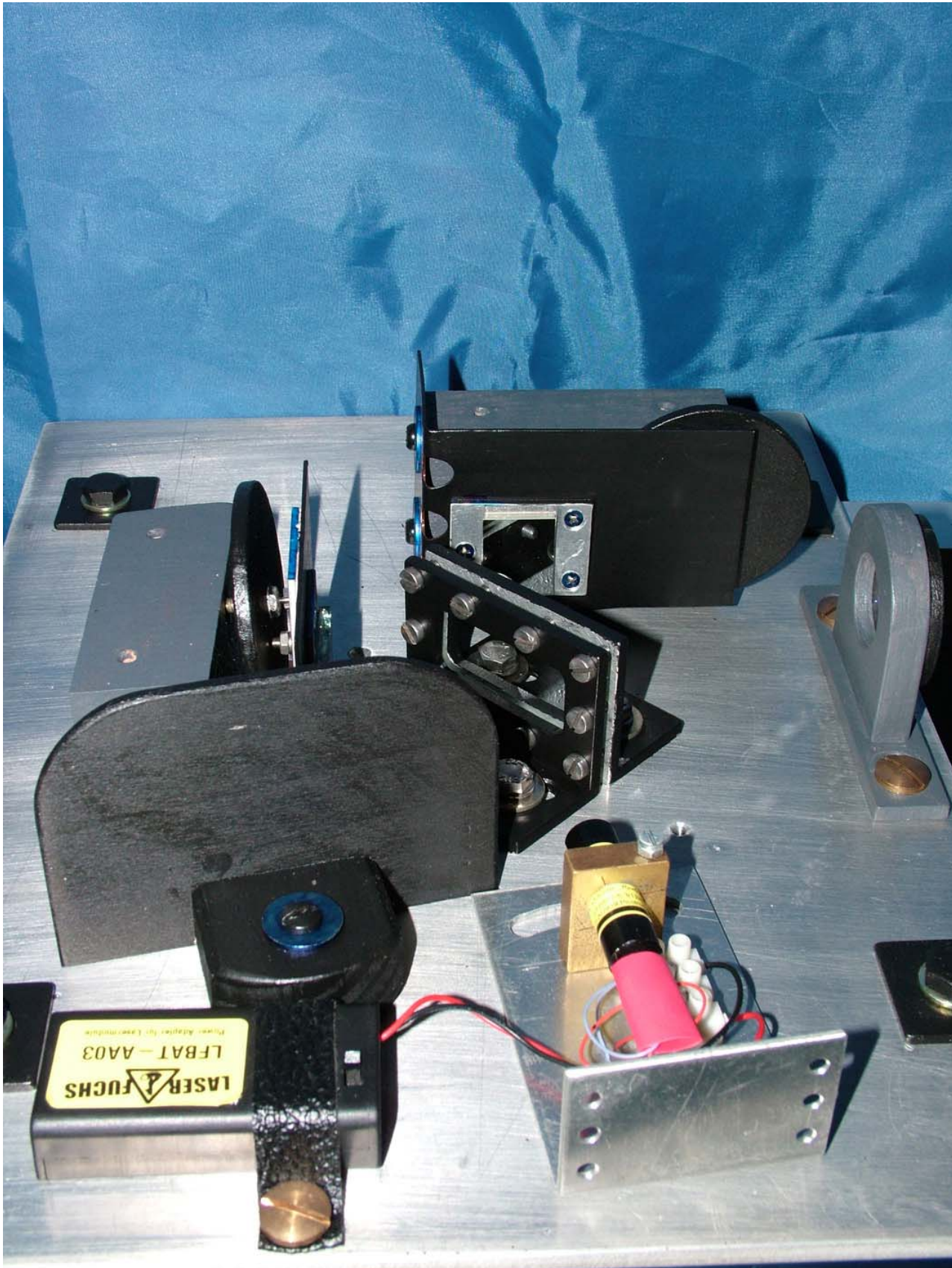
The beamsplitter:



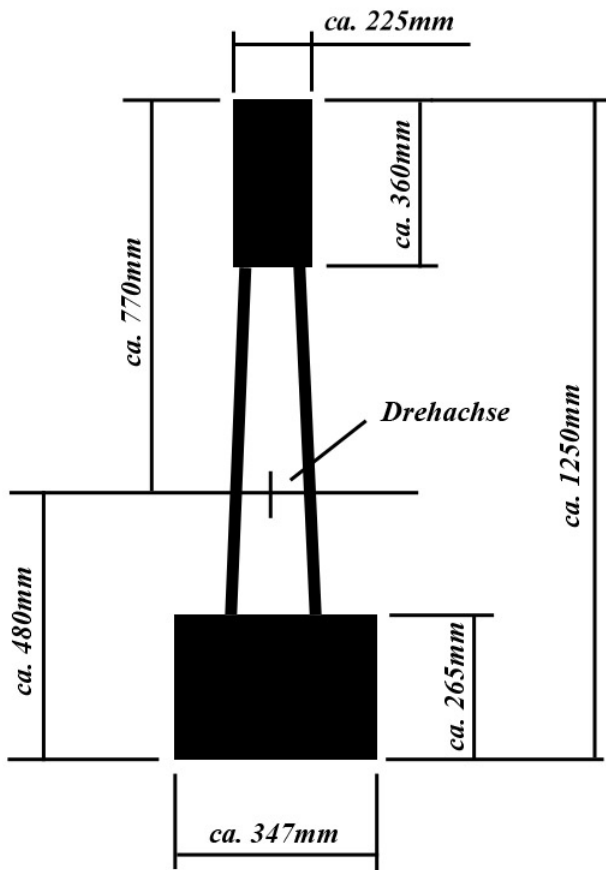
Old experimental set-up, complete view:



Old set-up, side view:



Old set-up, schematic with measurements:



Grundplatte Alu, 6mm
Tragarme Alu-Vierkantrohr 30x30x3