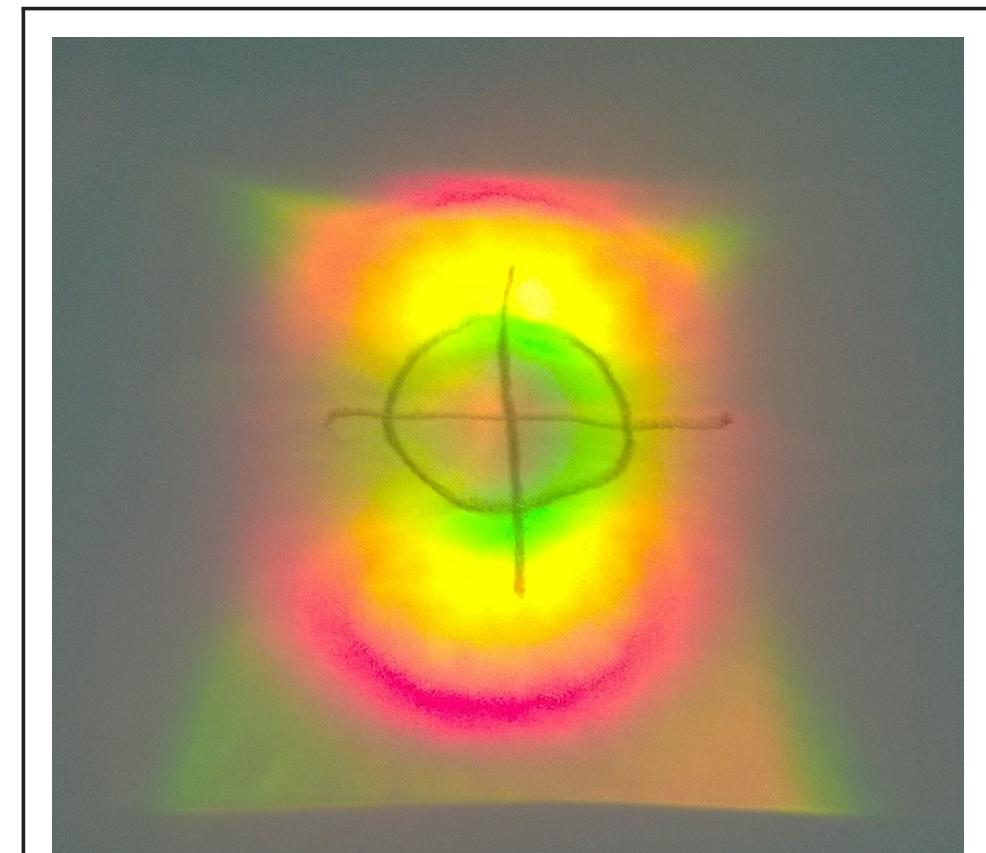


Levon Dovlatyan, Markus Ries, Paul Goslawski, and friends at HZB  
levondov@berkeley.edu

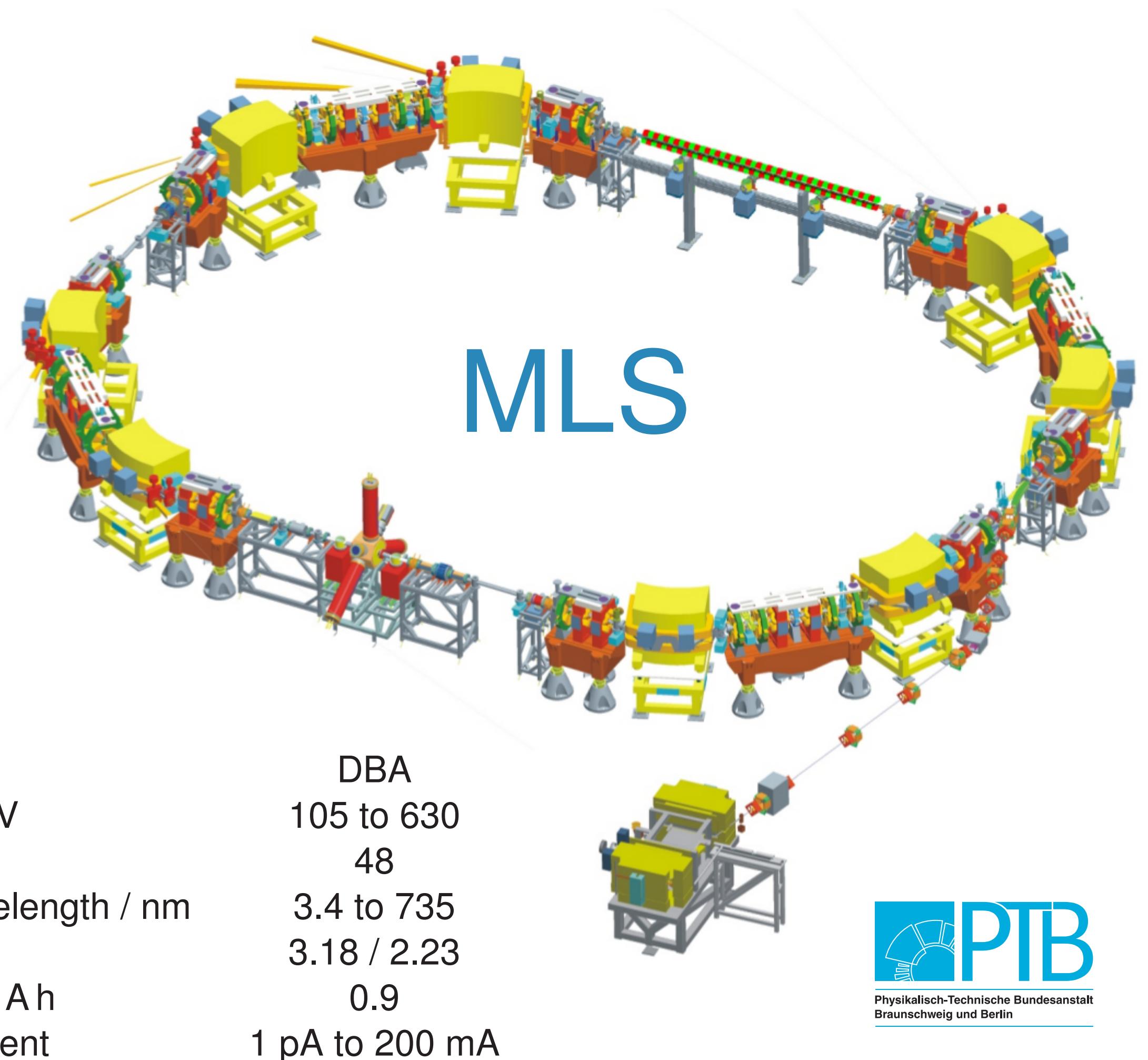
## Introduction

The Metrology Light Source (MLS) is an electron storage ring designed as a dedicated UV and VUV source; it has an asymmetric double-bend achromate design as well as a U180 undulator in one of its long straight sections. Radiation from this undulator as well as the magnets was used in initial test measurements of the bunch lengths with a new streak camera.

However, the new streak camera's arrival was delayed for a few weeks because of manufacturing problems; this allowed time to develop a tune resonance program to be used mainly at the MLS. The program is written in python making it much easier to integrate with the systems at Bessy II (HZB) and the MLS (PTB).

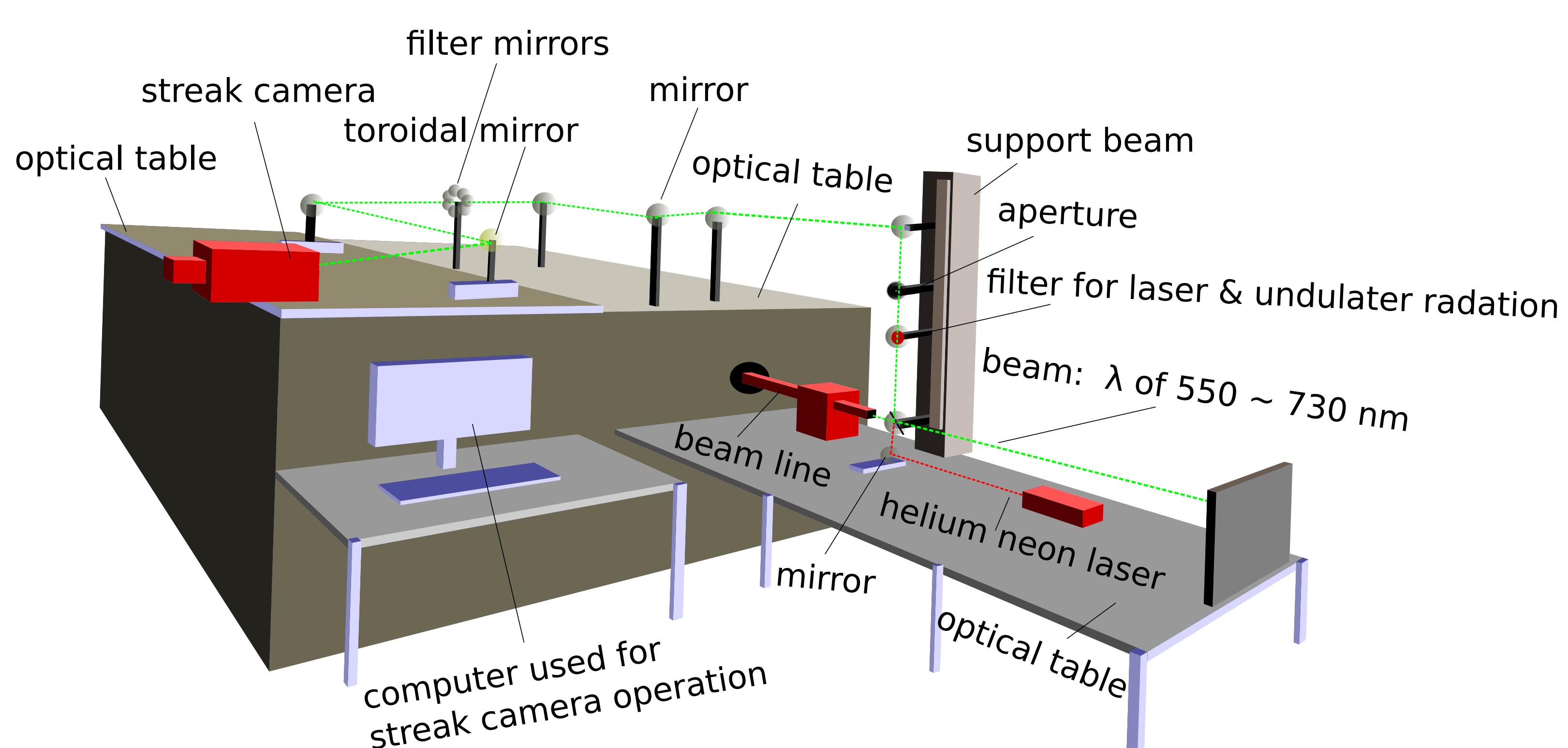


Beam used for alignment

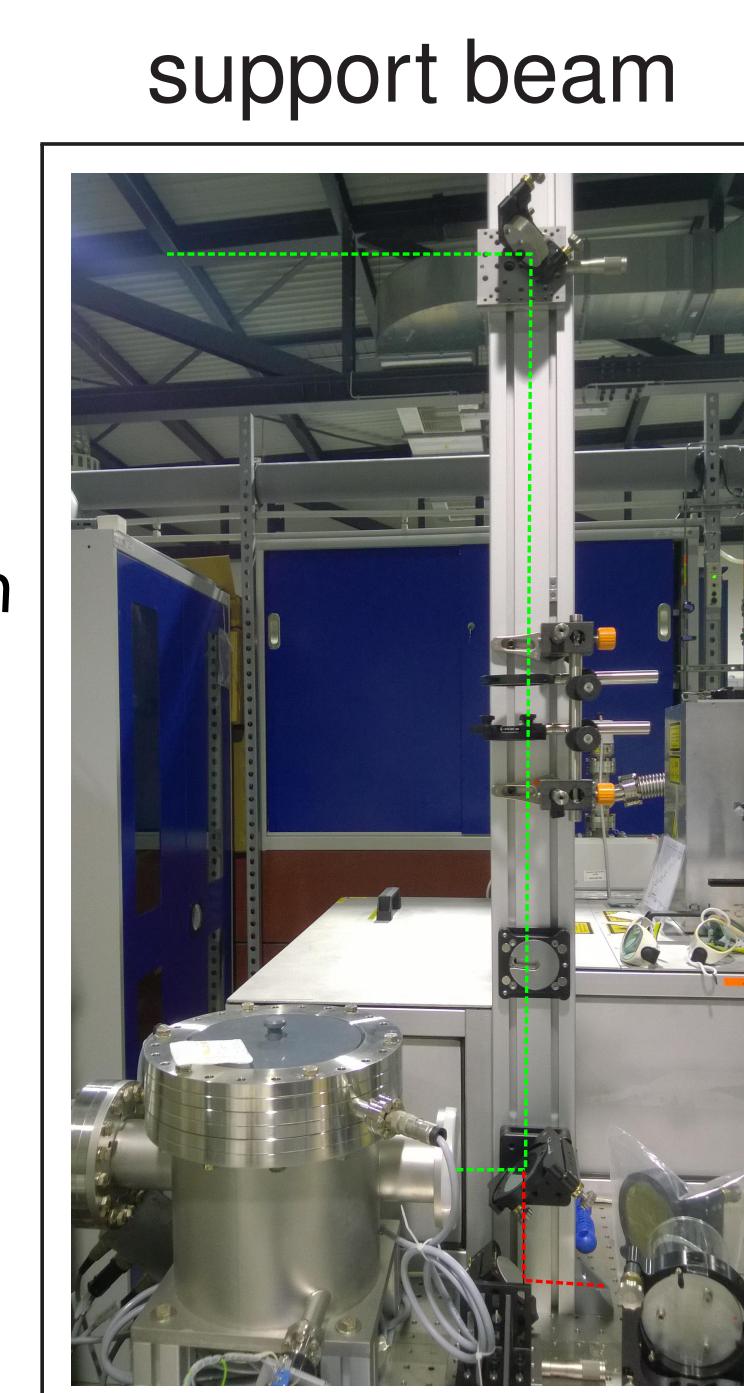


## Streak Camera

### Setup



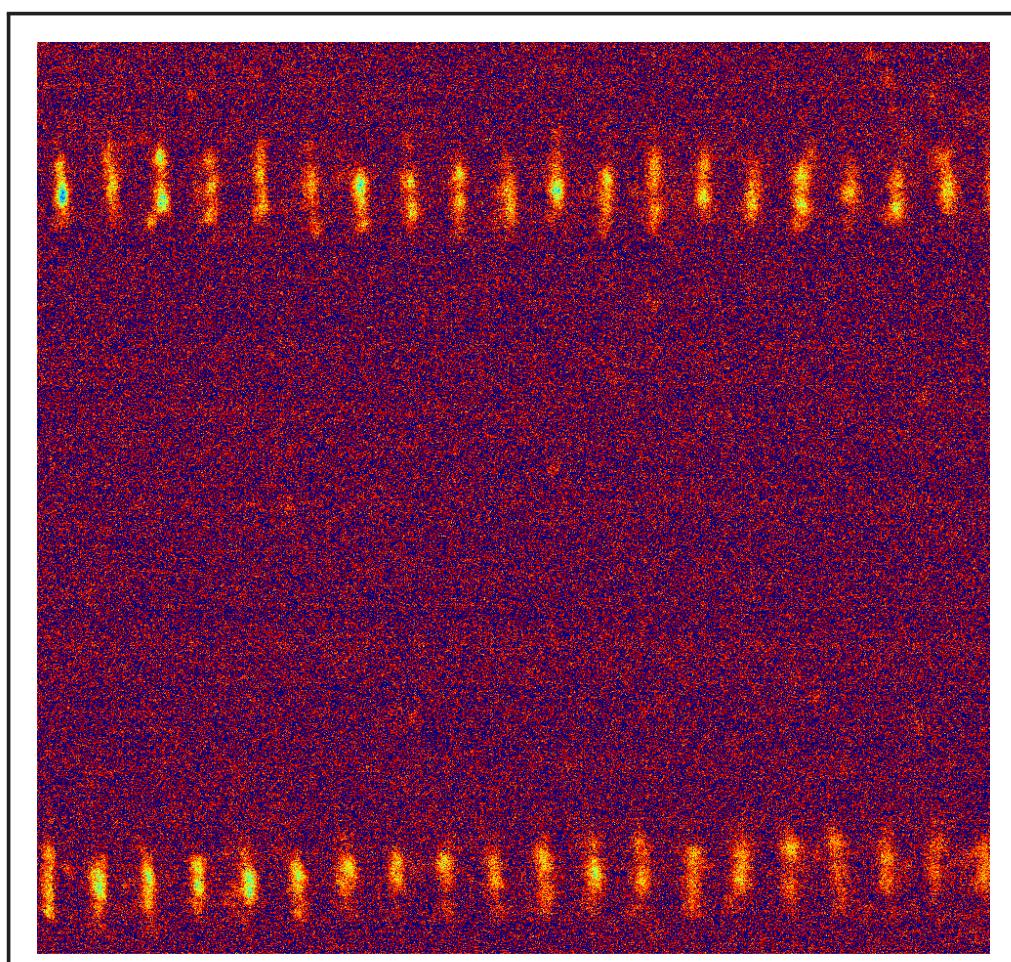
optical table setup for dual streak camera operation



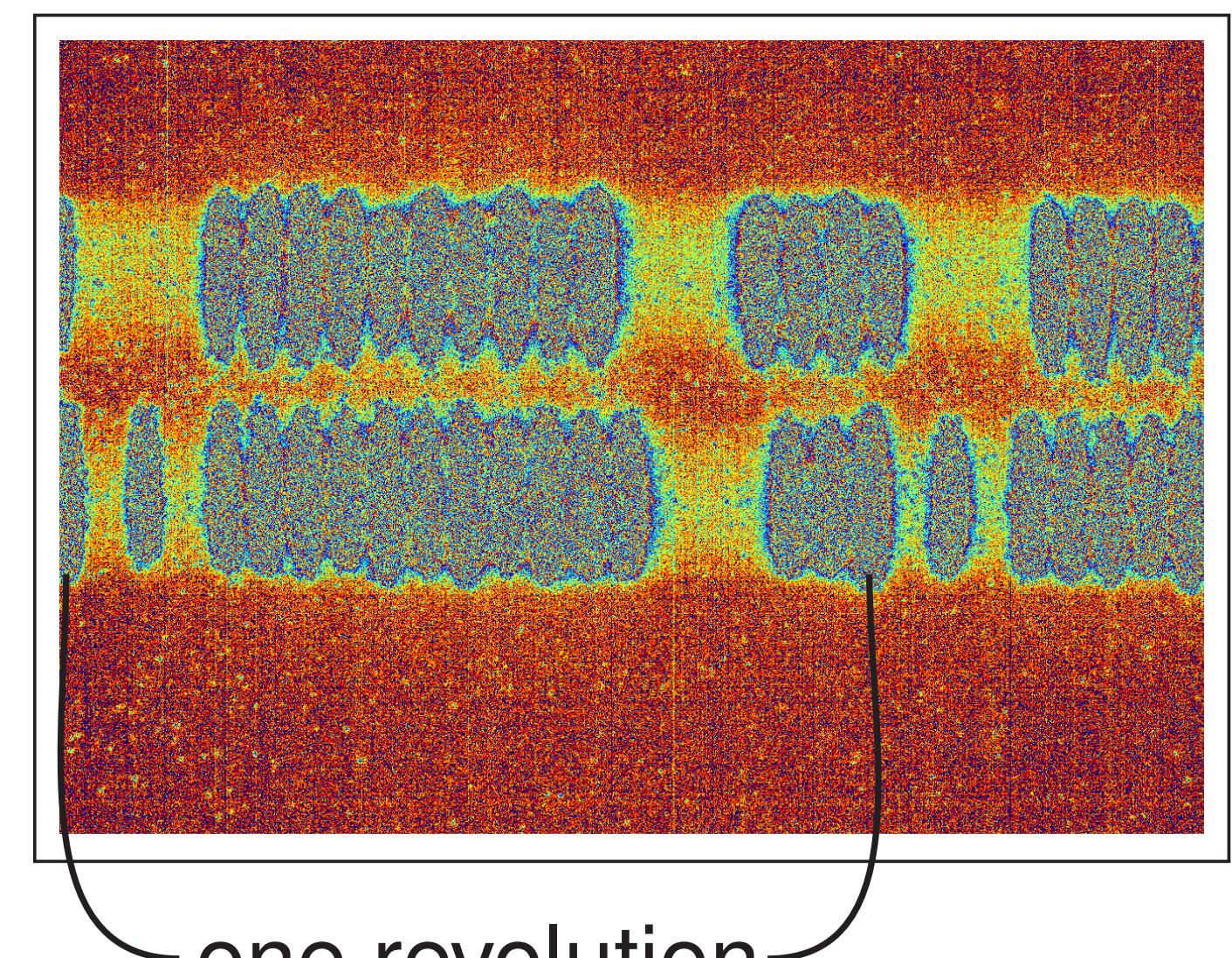
The toroidal mirrors, along with a splitter and a normal mirror, on the optical table are placed on rail systems in order to provide multiple degrees of freedom to adjust for the horizontal and vertical focuses of the beam

### Measurements

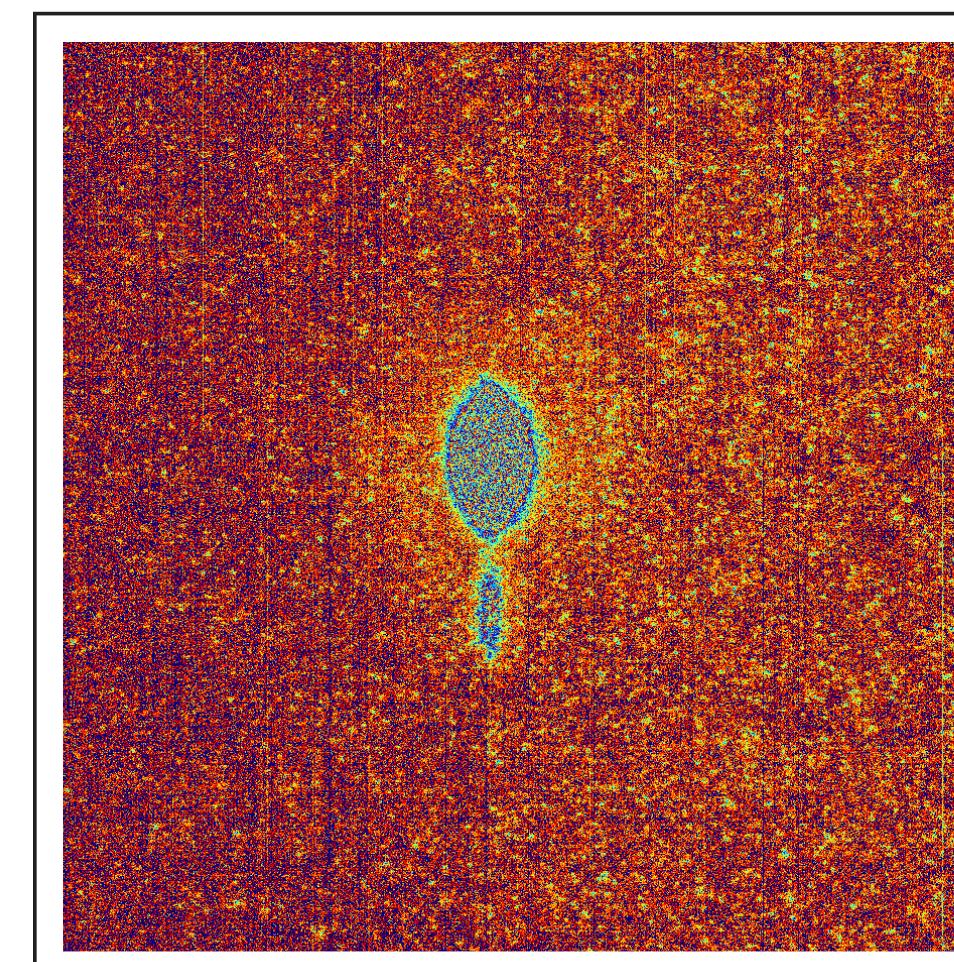
old camera, horizontal bunch length



new camera, horizontal bunch length



single bunch measurement



tune resonance program source code



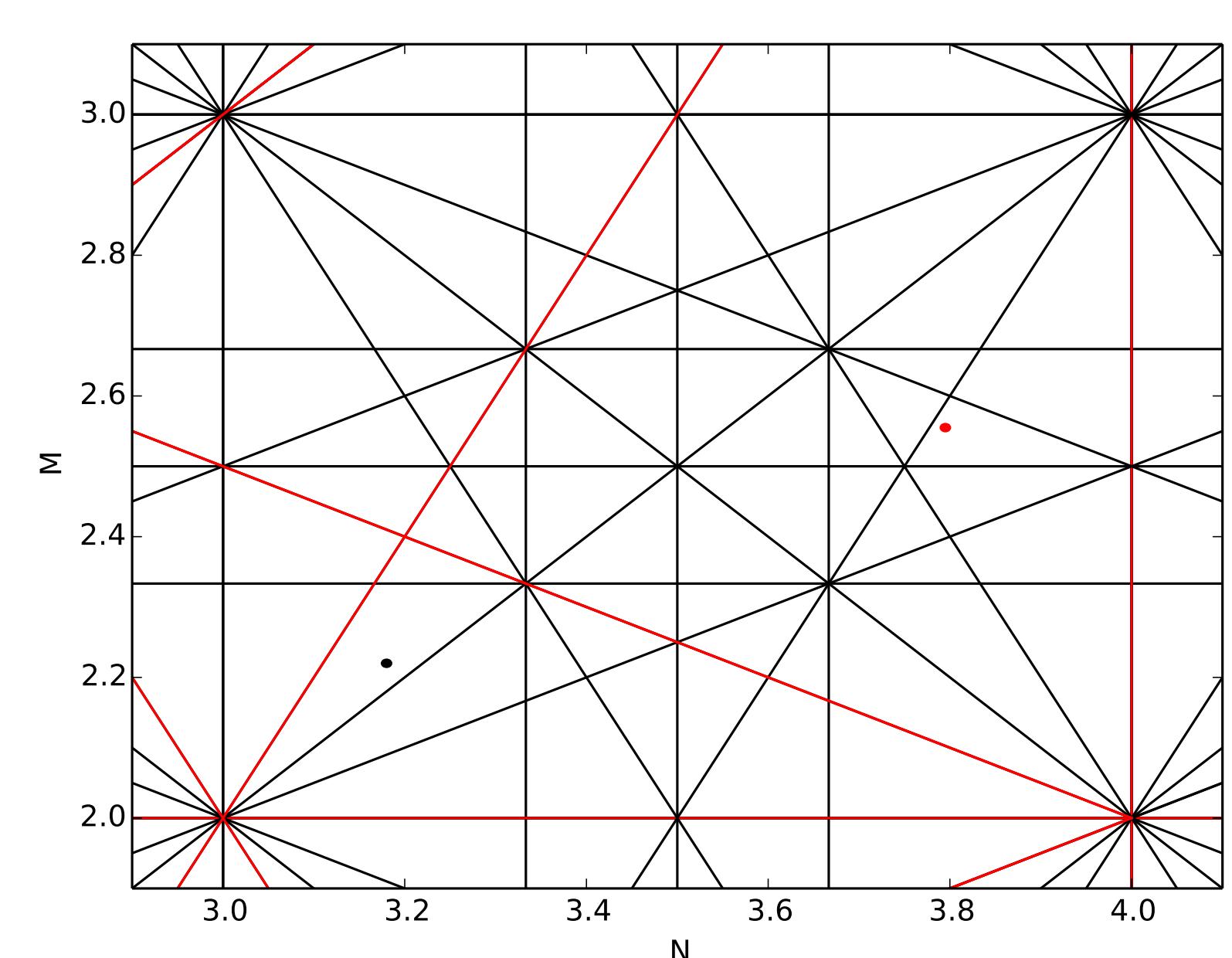
## Tune Resonance Program

### Details & Features

- developed in python
- contains GUI built with wxpython
- integrated with EPICS through the use of pyepics
- live mode that displays current non-integer working point
- given integer part, can display phase advance resonance lines and unit working point
- various customizability options available

### Pictures & Examples

Third order structural and phase advance resonance lines for the MLS



Fifth order difference resonance lines ordered by color

