

# 17 Mechanical Workshop

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Last year we again encountered a variety of challenges, which were all mastered with flying colours! While three major projects were in the pipeline, our building infrastructure was enlarged by several new installations. A new laser-cutting machine (Kern Laser Systems) in the welding shop required a new exhaust fan too. In the dust-free zone of our workshop both heat control and ventilation have been upgraded. Last but not least the frequently used entrance door to our material storage area was replaced after having served for quite some years.

To foster the exchange with many of our internal and external customers from UZH, ETHZ, Universities of Applied Sciences and local High Schools we organized our annual aperitif in autumn.

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A fine table lathe by the Swiss tradition company Schaublin expands our broad repertoire of machines and technologies. Its high working precision in combination with an increased revolution frequency allows us to achieve still better results when working with small parts. The new laser machine was finally delivered in August 2015. This thoroughly planned acquisition allows us to produce a great variety of different laser cutting designs, including specialized engravings, utilizing a broad range of metals.



- The new fine table lathe

In June we welcomed Chris Albrecht as our new co-worker. Meanwhile Chris is well incorporated and an important support. On the first of August 2015, Gian Knüsel joined us as new apprentice.

Our annual workshop courses for bachelor students, which took place in August/September 2015 and January/February 2016 were received with great enthusiasm. During the autumn months ETHZ apprentices trained their welding skills in our workshop.

In the following we high-light some internal and external projects to which we made major contributions:

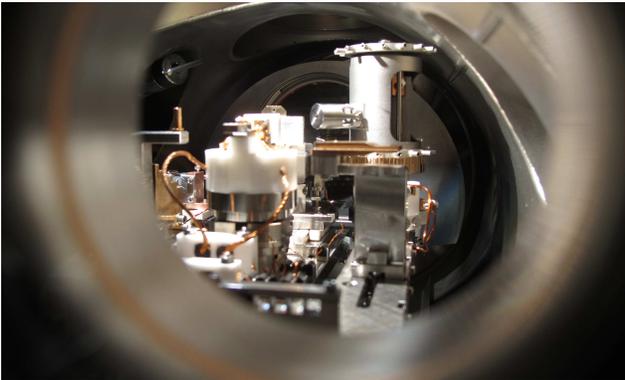
- Astroparticle Physics (Sec. 4)

In 2015 we focused our efforts on constructing and producing parts for the XENON experiment. 85 copper ring electrodes, used in the field forming structure of the time projection chamber, were welded together. These rings are made of high-purity copper for highest precision for the voltage divider. Besides many single parts, a transport unit was produced for the Teflon pieces.



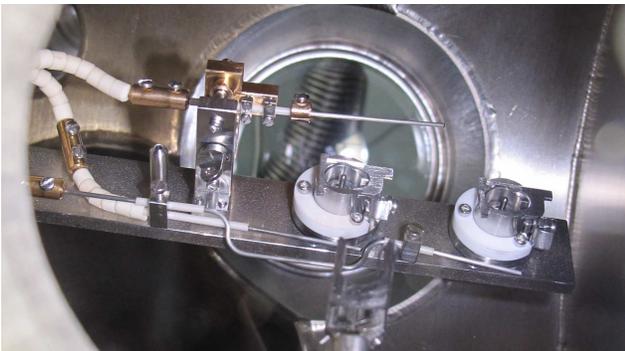
- Copper rings for the XENON experiment

- CTA Cherenkov Telescope Array (Sec. 6)  
The prototype camera was put together and shipped to DESY Zeuthen in Berlin. The work for two additional cameras has already started. Custom-designed racks with integrated cooling unit and parts of the insulation shield are currently being produced. Other parts such as spindles and nuts for the active mirror control were already produced successfully.
- Physics on the nanometer scale (Sec. 15)  
In this project the main goal was the production of the scanning tunnelling microscope as well as its very core, the sample preparation stage. Within the linear transfer section the probes can be purified and prepared in an Argon atmosphere.



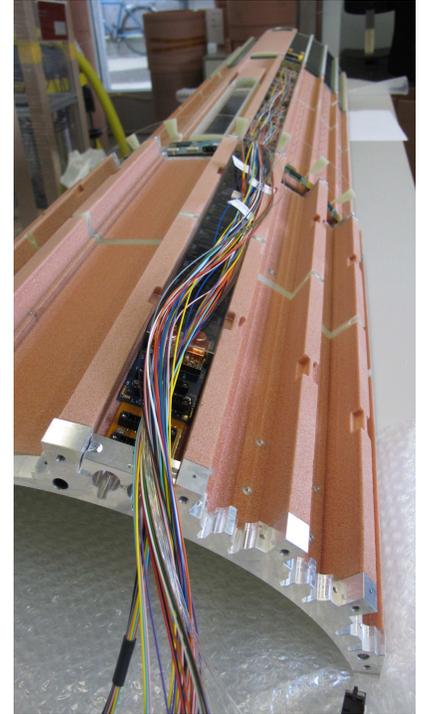
- Sample preparation stage

- Phase transitions, materials and applications (Sec. 13)  
A complete probe stick (Dipstick Desy) and a complete series of pucks were produced in the past few months for this project. Pucks represent a connection part between the cryostat and the probe stick.
- Surface Physics (Sec. 14)  
After having extended several on-going projects a major new project was the installation of the so-called wolf chamber and the reflector-vaporizer. In the latter alkali metals are vaporized onto a graphene surface. In addition to these tasks we completed another production series made from the not easily editible material molybdenum.



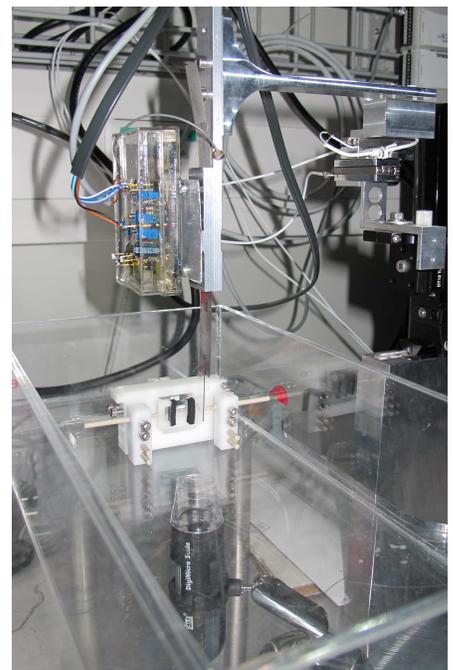
- Reflector vaporizer

- CMS Barrel Pixel detector upgrade (Sec. 11)  
Several milling- and rotating pieces were made for the production of the supply tube. In addition we had to establish several soldering and gluing gauges. Airex had to be tempered and preformed in an oven prior to the production of the supply tube.



- CMS supply tube

- Disordered and Biological Soft Matter (Sec. 16)  
A complete fish-stage was prepared. A microscope was rebuilt and different work-pieces for laboratory use were manufactured.



- Fish stage

- Demonstration experiments for the lectures  
In order to guarantee excellent demonstration experiments for the student lectures we designed and produced some new devices and revised and maintained several older parts.

- External orders and activity duties  
Thanks to our highly motivated and competent workshop team our workshop is well known outside the Physics Institute and we again received orders from external institutions and private companies.

We created CAD constructions and prototypes and performed complete assemblies for about 25 institutes of the University of Zurich. The tasks were manifold, ranging from the construction of simple plastic parts to engraved metal parts further to complex 5-axis milling workpieces. Very popular were also welding works, technical consulting in the choice of materials and in the design as well as bonding services.

Private companies that appreciate our technical expertise, are active in engineering and in lighting technology. For the latter we constructed complete lamps whereas milling, turning, welding and laser work was performed for the engineering companies.