The New Vertical Beamline for Biophysical Experiments ◇

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Radiobiological investigations using proton or heavy–ion accelerators are of increasing importance for the use of ions in tumor therapy [1,2]. A major problem in such experiments with "living" targets is to maintain under bombardment by the accelerator beam a suitable biological environment for the sensitive cell samples. For the survival of cells a certain humidity and often a special temperature or atmospheric environment is mandatory. A vertical beam direction allows cells or cell material to be irradiated in the medium or in solution through the thin bottom of petri dishes. Suitable temperatures or gas atmospheres can easily be maintained. In March 1996 the 90° analyzing magnet of the Tandem accelerator was replaced by a new more powerful magnet and the old one was used for the installation of a vertical beamline. The magnet was transported in parts to the mounting place at the end of the 0° port, where also a microlens experiment is planned to be set up [3]. For moving the 16 t magnet into its vertical position and for lifting it on its pedestal a special lever construction was used for the two cranes available in the target hall. For this purpose the portal crane from the first switcher magnet was disassembled and mounted at the site of the vertical beamline, so it could be used together with the hall's overhead crane. After the installation of the magnet a platform at a height of 4 m was erected around the vertical part of the beamline. The platform can be reached by a stairway from the side. The rebuilt power supply for the magnet and the whole beamline in 0° direction connecting the switcher magnet to the vertical 90° magnet was installed. The new vertical-beam facility was inaugurated December 9, 1996 in a ceremony in the presence of the Bavarian Minister of Environmental Affaires. The cultivation of biological targets like cell samples, bacteria cultures, DNA-solutions or multicellular targets requires clean and sterile conditions. To this end a rudimentary cell–culture laboratory was installed in the adjacent building including a sterile flow box, an incubator and a microscope.

References

[1] E.A. Blakely, in *Ion Beams in Tumor Therapy*, Ed. U. Linz, (Chapmann, Weinheim, 1995), p. 63.
[2] L. Distel et al., Proceedings of the Second International Symposium on Hadrontherapy, PSI/CERN, 1996.
[3] G. Hinderer, G. Dollinger, H.J. Körner, Jahresbericht 1995, p. 108

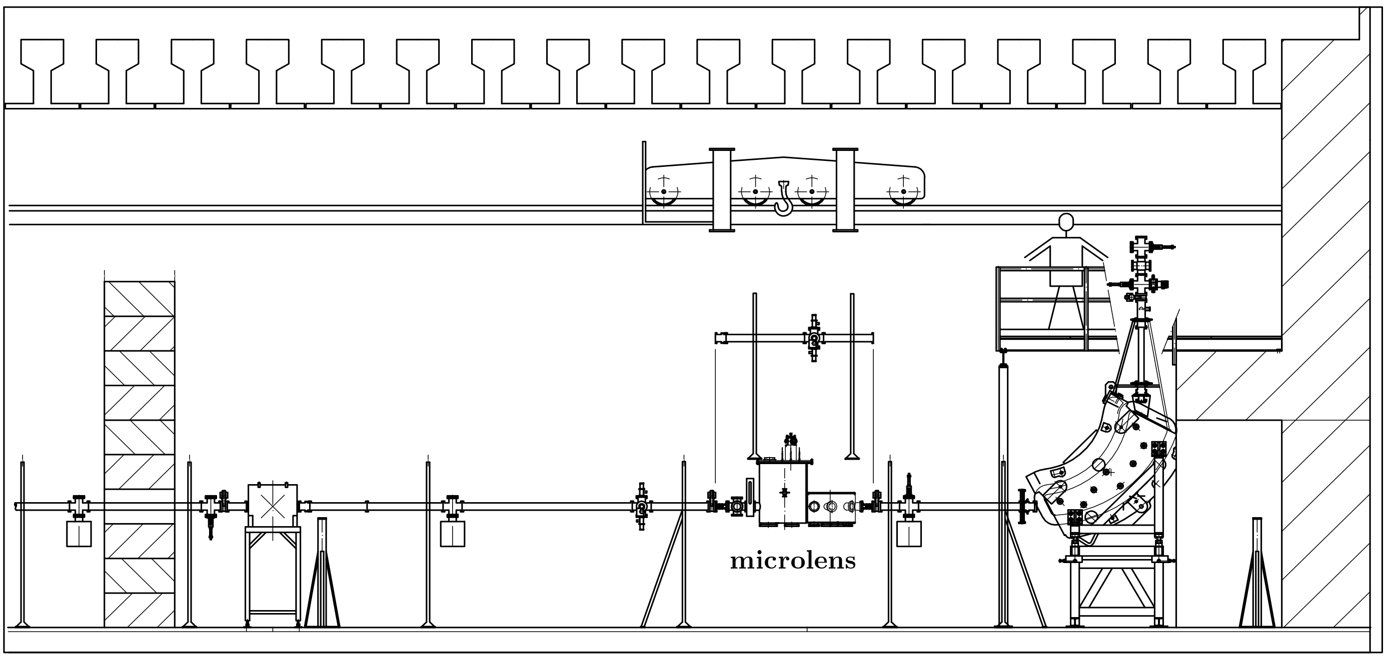

Fig. 1: The new vertical beamline

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