

HISTORY OF THE LASER OBSERVATIONS AT ZIMMERWALD

M. Ploner, P. Lauber, M. Prohaska, P. Ruzek, T. Schildknecht, A. Verdun, A. Jaeggi
Astronomical Institute, University of Bern, Sidlerstrasse 5, 3012 Bern, Switzerland, martin.ploner@aiub.unibe.ch

Introduction: In 1971 first tests with a ruby laser built by the Institute of Applied Physics of the University of Bern mounted along the tube of the Schmidt Cassegrain telescope were performed. The success was very limited, but first instrumental experience in the field of SLR observations could be acquired. Nowadays Zimmerwald is one of the most productive stations worldwide in terms of number of observed satellite passes and delivered normal points. A historical overview of the technical developments, in particular the various telescopes and laser systems used for the SLR observations, will be presented.

1971-1972: Very preliminary tests with a ruby laser built by the Institute for Applied Physics of the University of Bern (IAP) and mounted along the tube of the astronomical telescope, using the Cassegrain mirror as receiving telescope. Collection of valuable experiences but very limited actual success.

1974-1976: Construction of the satellite observatory Zimmerwald (an annex to the observatory with a new dome) in collaboration with the IAP

1976-1979: First successful ranging with the ruby laser. Accuracy about 80 cm.

1981-1984: Installation of a laser (Neodyme:YAG). Optics, electronic components, software and ranging accuracy (8 cm!) were significantly improved.

In **1992** the collaboration with the Federal Office of Topography (swisstopo) was significantly intensified. Since this year engineers of swisstopo have participated in the operation of the laser station.

1997: ZIMLAT, a new 1-meter telescope for astrometric observations and laser ranging was inaugurated. Installation of a new laser (Ti:Sapphire).

1998: The International Laser Ranging Service (ILRS) was founded. Zimmerwald becomes a tracking station of this service.

2006: Zimmerwald celebrates its 50 years anniversary. Installation of a new laser (Neodyme:YAG).

2009: Laser signals were sent successfully to the Lunar Reconnaissance Orbiter (LRO).

2013: First successful bistatic experiment to space debris in collaboration with the SLR Station Graz-Lustbühel