Tandem Operation

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In 2004 the tandem accelerator was running 7200 hours (300 days) for experiments. For maintenance each week 6-8 hours were scheduled but not used always due to very reliable operation of the machine. There were two maintenance periods one in March and the other in June. Only a few days for unscheduled tank openings were necessary for:

- replacement of a high voltage feedthrough for the chain charging system,
- cleaning of a polluted charging chain,
- shortening a charging chain(NE side middle chain),
- replacement of an idler wheel,
- replacement of a bearing of a chain wheel at high energy side in the terminal.

In February we have got 2.5 tons of SF_6 from the VIVITRON which was shut down at the end of 2003.

Operating statistics are shown in fig. 1 and table 1. The maximum terminal voltage applied for experiments is shown in fig. 1. Up to a terminal voltage of 13 MV the risk of sparking was very small, and therefore the users tried to avoid higher voltages for their experiments as in the years before. About 60% of the available beam time is devoted to applied physics in the field of AMS (32%) and materials analysis (28%). About 35% for nuclear physics and the rest for tests of new setups like Shiptrap or detector test for CRESST. The instrument most frequently in use, with about 30% of available beam time, was the Q3D magnetic spectrograph for nuclear physics as well as applied physics. About 18% of beam time was used for AMS studies with the GAMS system and 11% account for the microprobe SNAKE.

The control system based on an ARCNET network with about 60 node computers was running very stable all the year. Almost no new features were implemented and almost no changes in the programs were done. From Forthech (Rostock) we ordered some useful enhancements for the controll software. Now it is possible to run the programs under Windows XP. But the most interesting new feature is the ONF-Server. Only the server is connected to the ARCNET. The clients are connected via LAN to the server where all the controll programs can be used. Therefore it is not necessary in the future that every computer used for controlling the accelerator and beam line is connected to the ARCNET. The vacuum system of the Q3D magnetic spectrograph is now controlled by a S7-300 Simatic PLC and for visualisation WinCC is used. This change was needed because the old control system was obsolete and unsafe. The printed circuit board for controlling the stepping motors at the beamline has been redesigned. This redesign was necessary due to lot of changes in the original board. Now repair will be much easier. Further development of electrical components and even maintenance of electronics may become a critical point. We have still no electical engineer and probable no technician for maintenance of the existing electronics in the middle of 2005.

No new beam lines were implemented and no existing removed. The test setup for the UCN-Source Mini-D_2 in target room II has been moved to the Triga reactor in Mainz. An implanter for radioactive ^{32}P has been assembled in target room II and has delivered its first beam with stable phosphorus. In our laboratory we do not have the permission to produce a ^{32}P beam therefore the whole setup will be moved to the application center of the FRM-II when completed. We are now allowed to handle small activities of open radioactive ^{32}P in a room of our laboratory for test of materials of the RadBioMat-Project. A superconducting magnet with a 7 Tesla field has been installed in target room III. This magnet will be used for a penning ion trap. In 2004 we had 587 visitors in groups most from schools and 341 visitors at the open house.

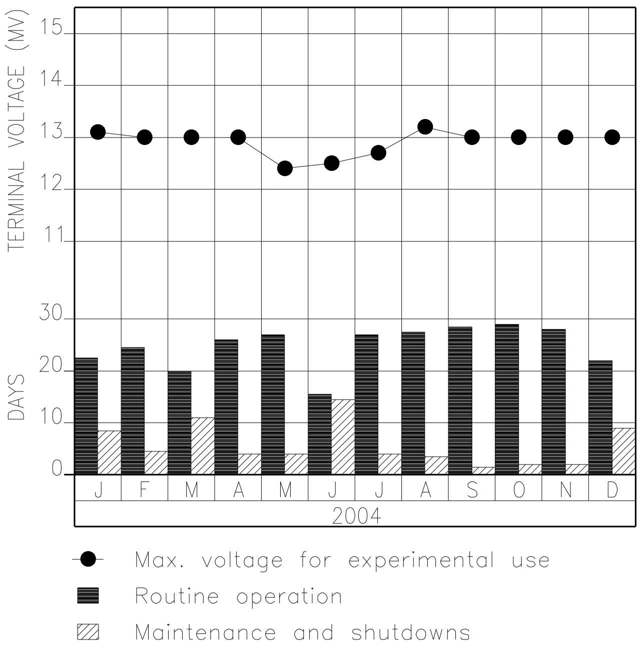

Fig. 1: Operating statistics 2004

ION	^{1}H	^{2}H	^{3}He	^{4}He	^{7}Li	^{11}B	^{12}C	^{16}O	^{34}S	^{35}Cl	$^{36}Cl^*$	$^{53}Mn^*$
%	11.3	5.1	2.9	4.2	0.7	2.9	3.7	4.4	2.2	1.3	1.2	11.0
ION	^{58}Ni	$^{60}Fe^*$	^{62}Ni	$^{63}Ni^*$	^{64}Zn	^{68}Zn	^{107}Ag	^{127}I	$^{129}I^*$	$^{182}Hf^*$	^{197}Au	$^{210}Bi^*$
%	5.2	2.2	1.9	1.3	1.7	4.4	1.9	8.5	9.7	4.7	5.7	1.9

Table 1: 2004 ion beam time in percent of total available beam time. The isotopes marked with an * were measured in AMS studies.