# I
# TANDEM

## Tandem Operation

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In 2003 the tandem accelerator was running 7600 hours (317 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 May and the other in August. Only two days for unscheduled tank openings were necessary for replacement of corona needles and some broken voltage dividing resistors, respectively. 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. About 46% of the available beamtime is dedicated to applied physics in the field of AMS and materials analysis. About 35% for nuclear physics and 19% for test of new setups like Shiptrap or detector test for CRESST. The instrument most frequently in use was the Q3D magnetic spectrograph for nuclear physics as well as applied physics. About 29% of available beam time was done there. About 13% of beam time were used for AMS studies with the GAMS system.

The control system based on an ARCNET network with about 60 node computers was running very stable all the year. No new features were implemented and almost no changes in the programms were done. One additional feature was added to the "Sequenzer" programm writen in Visual Basic to degauss two bending magnets in the injector to improve the transmission for ions from the polarized source.

New electronics for the low energy chopper is now complete. Installation and progamming is planned for beginning of 2004.

No new beam lines were implemented and no existing removed. A test setup for the UCN-Source Mini-$D_2$ has been installed in target room II using the infrastructure provided there.

Still we do not have an electrical engineer in our laboratory. So the situation did not change since last year. Further development of electrical components and even maintenance of electronics may become a critical point.

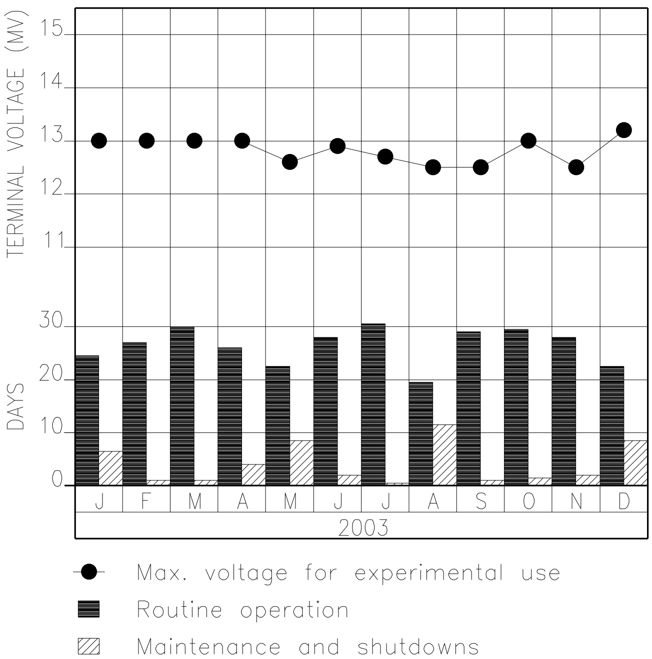


Fig. 1: Operating statistics 2003

| ION | $^{1}$H | $^{2}$H | $^{3}$He | $^{4}$He | $^{7}$Li | $^{11}$B | $^{16}$O | $^{32}$S | $^{35}$Cl |
|---|---|---|---|---|---|---|---|---|---|
| % | 12.0 | 5.0 | 3.3 | 4.9 | 2.5 | 9.3 | 7.4 | 2.1 | 7.7 |
| ION | $^{53}$Mn* | $^{54}$Fe | $^{58}$Ni | $^{63}$Ni* | $^{64}$Zn | $^{127}$I | $^{129}$I* | $^{197}$Au | Others |
| % | 2.2 | 2.5 | 1.7 | 1.6 | 1.7 | 7.4 | 2.2 | 10.9 | 15.6 |

Table 1: 2003 ion beam time in percent of total available beam time. The isotopes marked with an * are used for AMS studies.