INTRODUCTION

In 2015 the AN2000 and CN machine delivered beams to the experiments as requested by the beam time schedule. The total amount of beam on target time for the two accelerators was lower than the average value in the previous years and the reason of this is mainly due to the fact the two accelerators have been functioning in alternative mode for part of the year, due to personnel restrictions.

THE AN2000 ACCELERATOR

The AN2000 (see Fig. 1) worked for 1165 hours in 2015. Of these, 190 hours were necessary for maintenance, conditioning and beam preparation, while there have been 975 hours of beam delivered to the experiments.

For the whole 2015 some AN2000 users (eleven, at the end of 2015) were authorized to use the accelerator in partial self-service mode, during evening and night hours of the working days from Monday to Thursday.

After the restoration work, following the failure of the accelerator tube occurred in 2014 [1], AN2000 worked regularly and its working stability gradually improved during the year. Now the accelerator can reach again the 2.2 MV of acceleration voltage, after some hours of conditioning.

The cooling water circulation pump in the chiller of AN2000 was replaced in 2015 with a more powerful one, and now the cooling system provides a higher flow rate with a more effective cooling for the accelerator tank and for the analysis and switching magnets, with a proper water temperature. This improvement helped in the recovery of the machine reliability as a proper gas temperature in the tank is important to switch on the RF ion source promptly.

In the console two control instruments have also been added: a thermometer indicating the internal temperature of the tank (from a pt100 sensor) and a pressure gauge providing the gas pressure in the tank.

THE CN ACCELERATOR

In 2015 the CN Accelerator (see Fig. 2) ran for 1520 hours: 439 hours for machine maintenance and conditioning and 1081 hours of beam on target. The machine needed 350 hours of conditioning.

Since the beginning of November 2015 some CN users (seven, at the end of 2015) were authorized to use the accelerator in partial self-service mode during evening and night hours of the working days from Monday to Thursday, with the new rules approved in October 2015.

In 2015 some safety aspects of CN and associated facilities and infrastructure have been revised and improved where possible:

• the maintenance of CN GALILEO crane was done (see Fig. 3);
• installation and activation of a new control unit and two detectors of the oxygen level in the experimental hall at CN;
• the full lighting system in CN vain has been restored.
A preliminary version of the electronic logbook for CN and AN2000 prepared and activated (the same in use at TANDEM-ALPI-PIAVE) [2]; the automatic data recording from plc to a standard database was also started.

To improve the working behavior of CN, an extra maintenance of the drying system for the insulating gas was carried out at the end of the year (replacement of alumina, change or cleaning of the oil filters).

The CN maintenance periods were focused on the fixing of the following points:

- check and replacement of defective measurement devices inside the tank;
- rebuild of the power supply for the RF ion source system, and substitution of the coupling system;
- replacing of the previous internal tank service lights with a LEDs system;
- the amplifier of slits feedback system was checked and re-adjusted;
- design of a new switch to read pulsed beam signals and beam current value in console;
- replacement and testing of the ion source and of the related cooling fan;
- the stabilization system of the terminal voltage was re-calibrated;
- change of the protective and support screens for the power supply of the magnet on the HV terminal

CONCLUSIONS

Light ions small accelerators have been extensively used for many years in research and interdisciplinary physics. In the next year there will be a further effort to improve the effectiveness and the performances of AN2000 and CN.