38th INTERNATIONAL CONFERENCE
ON HIGH ENERGY PHYSICS
AUGUST 3 - 10, 2016
CHICAGO

Contribution ID: **1377** Type: **Poster**

The Frascati LINAC beam facility performance and upgrades

Saturday 6 August 2016 18:00 (2 hours)

Test beam and irradiation facilities are the key enabling infrastructures for research in HEP and astro-particles. In the last 11 years, the Beam-Test Facility (BTF) of the DAΦNE accelerator complex, in the Frascati laboratory, has gained an important role in the European infrastructures devoted to the development and testing of particle detectors. Electron or positron beam can be extracted before the injection into the damping ring to a dedicated transfer line, where a system composed by a target plus a dipole and collimating slits, can attenuate and select the momentum of secondary particles in narrow (<1%) band. The secondary beam is thus driven to a dedicated experimental hall for beam-test activities (BTF, beam-test facility).

The facility can provide runtime tuneable electrons and positrons beams in a defined range of different parameters: energy (up to 750 MeV for e- and 540 MeV for e+), charge (up to 1010 e /bunch) and pulse length (1.4–40 ns). The bunch delivering rate is depending on the DAFNE injections (up to 49 Hz). The electron beam spot and divergence can be adjusted, down to sub-mm sizes and approximately 2 mrad. Photons can be produced on a Bremsstrahlung active target, and energy-tagged inside a dipole magnet by means of Silicon micro-strip detectors. An optimized, shielded Tungsten target is used for neutron photo-production: about 8 10-7/primary, 1 MeV neutron are produced.

Overall, an average of 200 beam days are delivered to about 20 experimental groups each year. The possibility of delivering an high-intensity positron beam, opens the opportunity of performing positron annihilation missing mass experiments for the search of light dark matter particles, like dark photons, ALPs, etc.; recently the PADME experiment has been approved by INFN for running at the BTF in late 2017/beginning of 2018, for reaching an exclusion of ε=10-3 for invisible decays, up to 26 MeV/c2 dark photon masses.

An important upgrade program of the facility is under evaluation, along three main lines: consolidation of the LINAC infrastructure, in order to guarantee a stable operation in the longer term; upgrade of the LINAC energy, in order to increase the facility capability (especially for the almost unique extracted positron beam); doubling of the BTF beam-lines, in order to cope with the significant increase of users due to the much wider range of applications.

Authors: Dr BUONOMO, Bruno (INFN LNF); DI GIULIO, Claudio (INFN); FOGGETTA, Luca Gennaro (INFN-Laboratori Nazionali di Frascati); VALENTE, Paolo (Universita e INFN, Roma I (IT))

Presenter: VALENTE, Paolo (Universita e INFN, Roma I (IT))

Session Classification: Poster Session

Track Classification: Accelerator: Physics, Performance, R&D and Future Accelerator Facilities