

NTA ILC

D. Alesini, M. E. Biagini, S. Bini, R. Boni, R. Cimino, A. Clozza, A. Gallo, A. Ghigo,
S. Guiducci (Resp.), F. Marcellini, A. Stecchi

1 Introduction

The INFN has contributed to the GDE (Global Design Effort) for the International Linear Collider (ILC) since the beginning in 2005 with a qualified participation to the project design and R&D. In 2012 INFN has provided an important contribution to the completion of the Technical Design Report (TDR) [1]. This activity is fully integrated at the international level with INFN responsibilities in the GDE on Main Linac (Milano-LASA) and the responsibility of the Damping Rings (DR) area system at LNF.

2 Year 2012 Activities

In 2012 the GDE activity has been dedicated to the preparation of the Technical Design Report. LNF has chaired the write-up of the Damping Rings section of the TDR. The LNF effort has been dedicated to the coordination of the DR working group and to the technical sections on the radio frequency system and on the bunch-by-bunch feedback systems.

The R&D activity focussed on the mitigation of the electron cloud instability has achieved an important success with the test of electron clearing electrodes at DAΦNE [2, 3]. The electron cloud instability is one of the main issues for the performance of the ILC positron damping ring [4]. In order to mitigate such instability, special electrodes have been inserted in all dipole and wiggler magnets of the DAΦNE positron ring. It has been the first installation all over the world of this type; long metallic electrodes have been installed in all arcs of the collider positron ring and are currently used during the machine operation in collision. Experimental measurements have shown an impressive effectiveness of these devices in mitigating the e-cloud impact on the positron beam dynamics.

In the framework of the GDE, LNF has also contributed to the International Accelerator School for Linear Colliders [5]

The LNF accelerator Division is also involved in a Low Emittance Rings Collaboration, started from the ILC and CLIC working group on damping rings, with the scope to bring together scientific communities of synchrotron light sources, storage rings, damping rings and lepton colliders in order to communicate, identify and promote research work on common topics affecting the design of low emittance lepton rings. This collaboration will continue with the Low Emittance Rings Network within the FP7 European Project EuCARD-2, starting on May 1st 2013.

3 Publications and Talks

1. ILC Global Design Effort and World Wide Study, “International Linear Collider Technical Design Report”, to be published.
2. D. Alesini, A. Drago, A. Gallo, S. Guiducci, C. Milardi, M. Zobov, S. De Santis, T. Demma, P. Raimondi, “Experimental Measurements of e-cloud Mitigation Using Clearing Electrodes in the DAΦNE Collider”, p. 1107, Proc. of IPAC2012, New Orleans, Louisiana, USA, (2012)

3. D. Alesini, A. Drago, A. Gallo, S. Guiducci, C. Milardi, A. Stella, M. Zobov, S. De Santis, T. Demma, P. Raimondi, "DAΦNE Operation with Electron-Cloud-Clearing Electrodes", Physics Review Letters, to be published
4. J.A. Crittenden, J.V. Conway, G. Dugan, M.A. Palmer, D. L. Rubin, L.E. Boon, K.C. Harkay, M.A. Furman, S. Guiducci, M.T.F. Pivi, L. Wang, "Investigation into Electron Cloud Effects in the ILC Damping Ring Design", p. 1963, Proc. of IPAC2012, New Orleans, Louisiana, USA, (2012)
5. S. Guiducci, "Accelerator physics Lecture A3 Damping rings and ring colliders", presented at the Seventh International Accelerator School for Linear Colliders, 27 November - 8 December 2012, Indore, India, (2012)