CHANNELING 2010
Ferrara/October 2010

R.Chehab/IPNL

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- TOPICS
- Coherent scattering of relativistic charged particles in matter
- Radiation of relativistic charged particles in periodic structures (coherent bremsstrahlung, channeling radiation, resonant transition radiation, diffraction radiation, parametric x-ray radiation, LPM effect)
- Crystal channeling, volume capture and crystal reflection of positive ions: theory and experiments; crystal assisted collimation in hadron colliders
- Channeling of radiations in capillary systems (micro- and nano-channeling, nanotubes, nanoporous)
- Novel types of sources for electromagnetic radiation (FEL, Thomson scattering, laser plasma acceleration)
- Applications of channeling phenomena (bending of the beams, positron sources, powerful radiation sources, x-ray waveguides, capillary/polycapillary optics, novel x-ray table-top instruments

CHANNELING 2010
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- ABSTRACT FOR A POSTER ON CHANNELING FOR POSITRONS
- Positron Sources using Channeling: a promising device for Linear Colliders
- X.Artru[a], I.Chaikovska[b], R.Chehab[a], M.Chevallier[a], O.Dadoun[b], K.Furukawa[c], T.Kamitani[c],
- T.Omori[c], G.Pei[d], F.Poirier[b], L.Rinolfi[e], M.Sato[c], V.Strakhovenko[f], T.Sugimura[c], T.Suwada[c],
- T.Takahashi[g], K.Umemori[c], J.Urakawa[c], A.Variola[b], A.Vivoli[e], C.Xu[b,d].
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- c KEK, Tsukuba-shi, Ibaraki (Japan)
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- The needs of intense and bright positron sources for linear colliders enhanced the researches on polarized and unpolarized positrons. For the latter and since 20 years continuous theoretical and experimental investigations on positron sources using axial channelling of energetic electrons in aligned monocrystals showed powerful applications in this domain, not only on the level of intensity but also for the minimization of the deposited energy. Simulations using the channelling programme of V.Strakhovenko associated to GEANT4, provided a description of this kind of sources using tungsten crystals as photon radiators and amorphous tungsten as converters, the so-called *hybrid source* ; the incident electron energies are taken between 5 and 10 GeV. Some applications are shown, here, for CLIC, for which this source is the baseline and also for ILC. The simulations are also concerning the test at KEK of such *hybrid source,* with a crystal radiator and an amorphous converter separated by a sweeping magnet. Future developments on the simulation programme are also reported.

CHANNELING 2010
FERRARA

- ABSTRACT FOR INVITED TALK ON POSIPOL
- **POSIPOL: from polarized and unpolarized photons to positrons**
- **Robert Chehab***
- **IPNL, IN2P3/CNRS, Universite de Lyon, Universite Lyon 1, F-6922 Villeurbanne**

- **POSIPOL represents a series of annual workshops started in 2006 at CERN and concerning polarized and unpolarized positron sources for linear colliders . Photons radiated by high energy (> 150 GeV) electrons in long helical magnetic undulators as well as Compton photons resulting from the interaction of circularly polarized laser photons with GeV electron beams create polarized e-e+ pairs in thin targets. For unpolarized positron sources, a method using photons radiated by GeV electron beams channeled along the axes of oriented crystals provides well suited solutions for some colliders. More recently, some developments on conventional amorphous targets have also been carried out. Many technical problems resulting from the high intensities as heating and thermal shock waves in the targets or from the low e+/γ yields as stacking of large number of bunches in the Damping Rings, have been investigated. Optimization of the capture systems after the target is worked out considering various matching systems. Applications in medical science have also been considered using Compton photons in X domain. These activities are shared in the framework of large collaborations involving laboratories of USA, Europe, Asia. We present, here, the last developments in these fields and show how POSIPOL meetings enhanced the collaborations between different groups.**

- * **On behalf of the POSIPOL collaboration**

CHANNELING 2010
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- **PARTICIPATION TO CHANNELING 2010**
- **On behalf of Prof. Sultan Dabagov, I remind to the colleagues involved in ILC/CLIC e+ studies that their participation at the conference CHANNELING 2010 to be held at Ferrara from 3 to 8 October is fully wished.**
- **The abstracts must be sent by the end of the month, before July 23d preferably. The registration is open with a wider deadline (up to October 3d)**
- **The conference site is:**
- **http://www.lnf.infn.it/conference/channeling2010**