

at Chalk River, Canada. In France, GANIL has also been active in this field. Christoph Scheidenberger reviewed plans to continue these measurements at GSI, Darmstadt. In the future it may be possible to extend this technique to nuclear excitation. As noted by Sheldon Datz of Oak Ridge, SPS heavy ion beams might be used to good advantage for such studies.

One of the features of the workshop were "cultural" presentations to explore possible future applications. Lene Hau of the Rowland Institute reported on a Brookhaven measurement of spin densities with MeV positrons. Peter Kasper of Fermilab discussed future high energy photon beams. Coherent bremsstrahlung might be used to harden such beams. Andreas Schäfer of Frankfurt discussed the possibility of channeling for studying strong field effects. Martin Merck from Max Planck-Garching felt that oriented crystals would be hard to use for gamma-ray astronomy in the multi GeV region due to low intensity.

Perhaps the cloudiest area is the exotic accelerator field. Ron Ruth of SLAC summarized some concepts for future accelerators and the possibility of using damping in a crystal channel to provide ultra cold beams. David Cline of UCLA speculated on the possibility of laser excited crystals as accelerators imbedded in a muon collider lattice.

In general, much remains to be done. More information is needed on channeling, dechanneling, and on materials other than silicon. Polarization phenomena need to be mapped out in crystal radiations. On the other hand, some areas, such as heavy ion channeling and parametric radiation, are blossoming.

The workshop was organized by Dick Carrigan of Fermilab and Erik Uggerhøj at Aarhus.

Erik Uggerhøj

Electronics for LHC experiments

A major effort is being mounted to prepare the way handling the high interaction rates expected from CERN's new LHC proton-proton collider (see, for example, November, page 6).

September saw the First Workshop on Electronics for LHC Experiments, organized by Lisbon's Particle Physics Instrumentation Laboratory (LIP) on behalf of CERN's LHC Electronics Review Board (LERB - March, page 2). Its purpose was not only for the LERB to have a thorough review of ongoing activities, but also to promote cross fertilization in the engineering community involved in electronics design for LHC experiments.

The Workshop gathered 187 physicists and engineers from 20 countries including USA and Japan. The meeting comprised six sessions and 82 talks, with special focus on radiation-hard microelectronic processes, electronics for tracking, calorimetry and muon detectors, optoelectronics, trigger and data acquisition systems. Each topic was introduced by an invited speaker who reviewed the requirements set by the particular detector technology at LHC. At the end of each session, panel discussions were chaired by each invited speaker.

Representatives from four major integrated circuit manufacturers

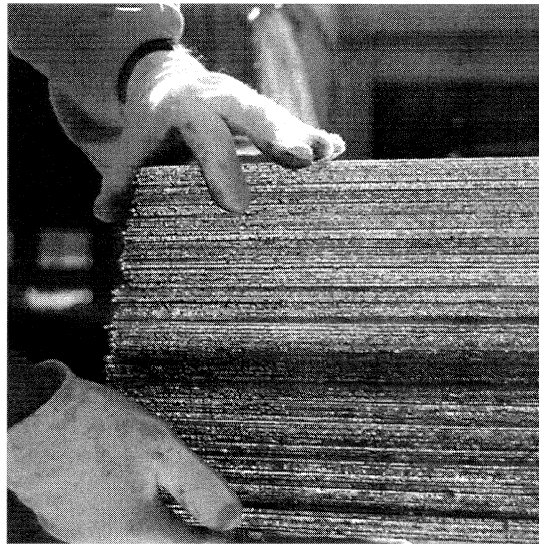
covered advanced radiation hard processes. Two talks highlighted the importance of obsolescence and quality systems in the long-lived and demanding environment of LHC.

The Workshop identified areas and encouraged efforts for rationalization and common developments within and between the different detector groups. As a result, it will also help ensure the reliability and the long term maintainability of installed equipment. The proceedings of the Workshop are available from LIP Lisbon*. The LERB Workshop on Electronics for LHC Experiments will become a regular event, with the second taking place in Hungary, by Lake Balaton, from 23-27 September 1996. The Hungarian institutes KFKI-RMKI have taken up the challenge of being as successful as LIP Lisbon in the organization of the event.

**Copies of the proceedings should be ordered directly from LIP, Av. Elias Garcias, 14-1°, P 1000 Lisbon, e-mail natalia@vaxlip.lip.pt*

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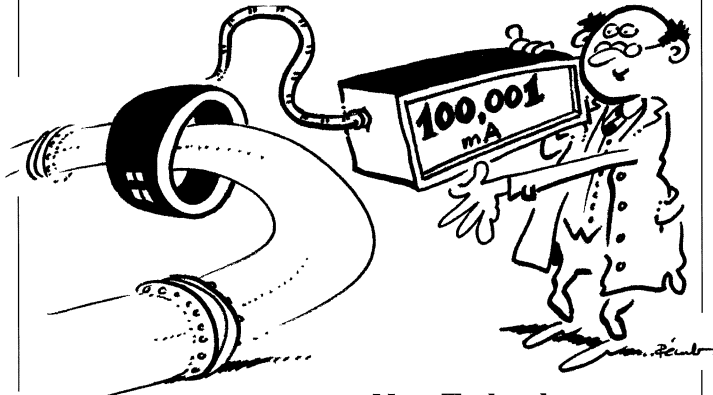
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