Postdoctoral Position in High Energy Astrophysics

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2002-2005 PhD thesis on the GLAST project : Contribution to the calibration of the Large Area Telescope (LAT) and GEANT4 hadronic cascade benchmarks, relying on three beam tests held at GANIL, CERN and GSI (to be defended in September 2005).

CsI light quenching measurements with high energy heavy ions is necessary for the LAT calorimeter on-orbit calibration with cosmic rays.

I prepared the detectors, developed and ran a dedicated acquisition system for the first beam test held at GANIL with low energy ions. We used two standard GLAST CsI logs in association with silicon detectors, and acquired data via NIM electronics and VME under Lynx OS. I analyzed data (including multiple calibrations and crosschecks) in order to measure the light quenching factor in CsI for all of ions from protons to krypton with energies between 0 and 73 MeV/nucleon. My results are of prime interest to understand and confirm measurements light quenching measruements for relativistic ions, obtained from the GSI beam test.

Hadronic background rejection is another major issue for GLAST and all the algorithms for particle identification rely on the Monte-Carlo simulation.

I prepared the detectors and participated in the GLAST GSI and CERN-SPS beam tests. I analyzed electromagnetic and hadronic data from both beams to benchmark hadronic cascade simulations using GEANT4 on which GlastRelease, the GLAST Monte-Carlo code, is based. Testing the accurate reproduction of parameters such as the energy deposit per layer or the number of CsI logs hit in GLAST calorimeters for hadronic cascades generated by 1.7GeV, 3.4GeV, 10GeV and 20GeV protons or pions led us to the conclusion that at low energy the Bertini intra-nuclear cascade model should be used whereas at high energy the default LHEP model is appropriate. The use of these special GEANT4 hadronic models has also been tested successfully in GlastRelease itself as an integrable feature.

Experience

2003 Teaching Computer science for 4 months to first year students from the Institute for Technology of the University of Bordeaux (Pascal programming language and Microsoft Excel)

2002 Four months internship at the Institute for Astronomy (Hawaii), to analyze data taken on the 3.6m telescope of the ESO in La Silla observatory, to study pre-main sequence binary stars.

2001 Two months internship at the public department for sea services in La Rochelle, to participate to the development of a new analysis software for bathymetric data.

Diplomas

1999/2002 Engineering Physicist at the Grenoble National Engineering School for Physics (E.N.S.P.G.)

Master of Science : Astrophysics and diluted media, at the Joseph Fourier University in Grenoble.

QUALIFICATIONS

- Fluent English, working knowledge of Spanish
- Computer science : both Windows and Unix based operating systems
- Programming languages : C++ and some Java, Pascal and Fortran
- Tools : ROOT, GEANT4, GlastRelease, IRAF, Autocad

OTHER ACTIVITIES : judo (black belt), surfing, piano

PUBLICATIONS

- GSI beam test NIM : B. Lott and F. Piron et al, *Response of the GLAST LAT Calorimeter to Relativistic Heavy Ions,* Preprint submitted to Elsevier Science, July 2005.
- CERN beam test NIM in preparation : B. Lott et al.
- Proceedings of the Journées Jeunes Chercheurs 2004 : J. Bregeon, P*rojet GLAST : Contribution à l'étalonnage en énergie du LAT*.

REFERENCES

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