



Short Summary of APP Meeting

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Very short summary

- Show some pages from '79 proceedings...
- Progress since 1979 Workshop at Baikal
- Some neutrino areas huge:
 - Baikal experiment operated 22 years now, plans...
 - Foreseen Detectors:
 - km^3 HE nu instrument realized at South Pole
 - KM3NET now well under development
 - Underground kT detectors fantastically successful in many areas, SN1987A and oscillations prominent

Other related areas progress too

- Complimentarity of gamma and neutrino astronomy...
 - ~1990 GeV-TeV gamma ray astronomy established, now with hundreds of VHE sources
 - Most sources do not show evidence of hadronic activity... mostly consistent with inverse Compton, but high energy fluxes \gg TeV
 - Yet we do see EeV CRs, almost surely nucleons
 - Gamma ray sky is extremely episodic... (as seen in Fermi-LAT and Blazars, even Crab)

Neutrino Astronomy Prospects

- Experiments approaching B-Z flux calculations...
- Much scheming about how such might be evaded... physics almost impossible
- Big controversy about composition... crucial to nu astron since Fe gives little in the way of neutrinos.

EAS Studies

- Much progress to higher energies, particularly with Auger and many others. TUNKA. Radio.
- Yet situation still not much different than 1979... composition in much debate, existence of knee(s), sources at $>PeV$ completely unknown still.
- Interesting hints that MCs do not well predict muon content at extreme energies. Cross section lower than many expectations.??

Technology

- Big vacuum PMTs have matured
- Many ideas of 1979 not realized (in particular a large cylindrical PMT)
- Great progress in timing 10ns \rightarrow \lt ns
- and in QE... \sim 20% \rightarrow \sim 40% (more?)
- Wonderful new devices: APDs, SiPDs....
Great for many applications
- Still need 21st century large detector....
LAPPDs? Hybrids? PMT cost still large driver for big projects.
- Grand progress in electronics and fiber optics.. No longer cost drivers.

Other topics

- No time to review interesting:
 - New work in EAS techniques
 - Radio related work
 - Other interesting local studies in Baikal
 - Hurrah for the Higgs discovery
 - Superconductivity remains mysterious

Thanks, Future

- Many many thanks to Bayarto, Yuri and others who made this meeting a reality.
- We love the Ulan-Ude region, and wish for wide exposure of magnificent environment, and wonderful people of region.
- Great to see old friends and new.
- We hope for another meeting soon!