Welcome to the

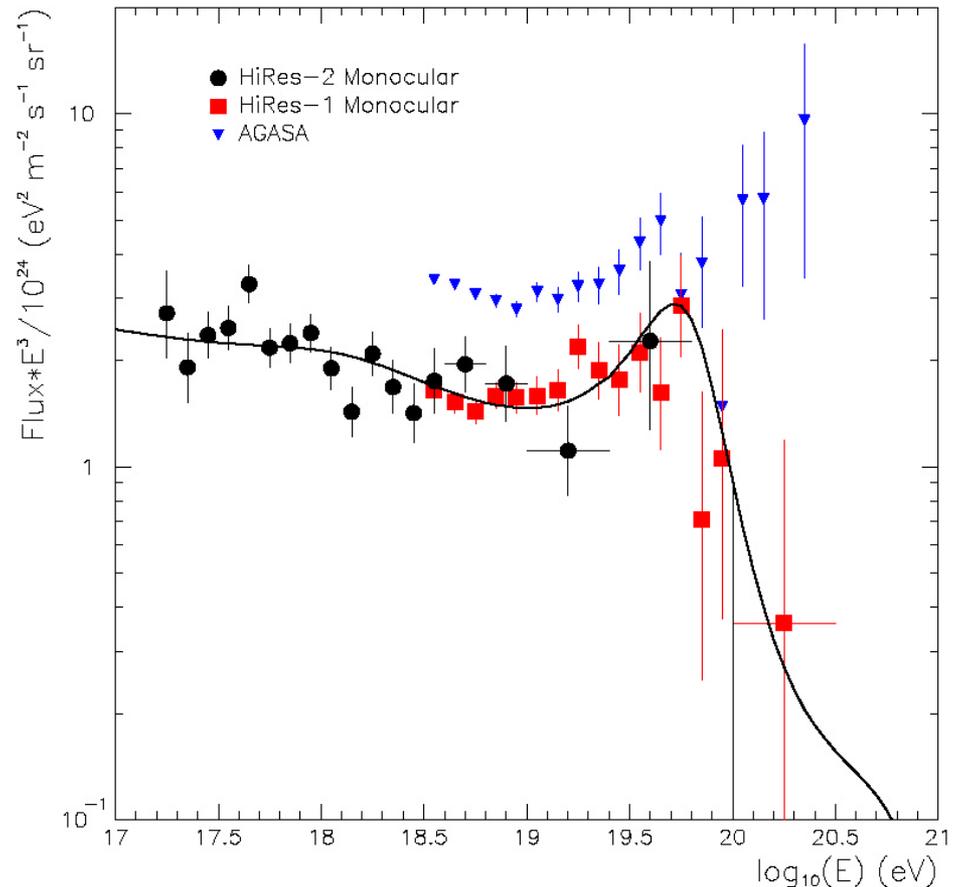# "First MiniWorkshop on Acoustic Cosmic Ray Detection"

A few facts:

- **UHECR** empirically not well understood: still unclear what happens at/above the GZK cutoff
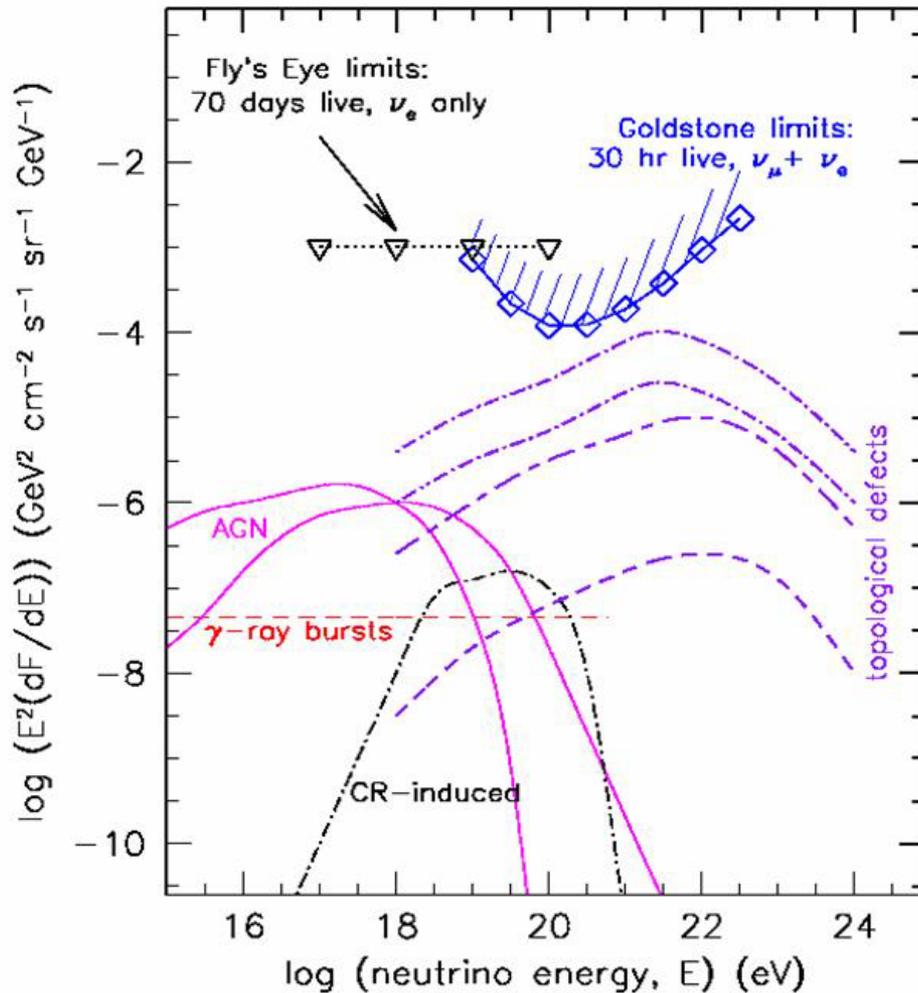- **UHECR** acceleration mechanisms not well known

Fact 1

Latest HiRes data seem to interestingly contradict AGASA

The study of neutrinos in the UHE regime is still in its infancy

Fact 2

The task of studying these highest energy particles is daunting:

Fact 3

- Huge acceptance/large livetime
- Redundancy/Complementarity
- Energy resolution
- Particle identification
- Physics of the shower not necessarily completely understood

Need several complementary techniques, in some case to replace older methods, more often to complement and cross-check each other.

Conclusive results will come from a mosaic of data taken with different detectors

The stunning progress of γ astronomy is supported by a large variety of different instruments...

Fact 4
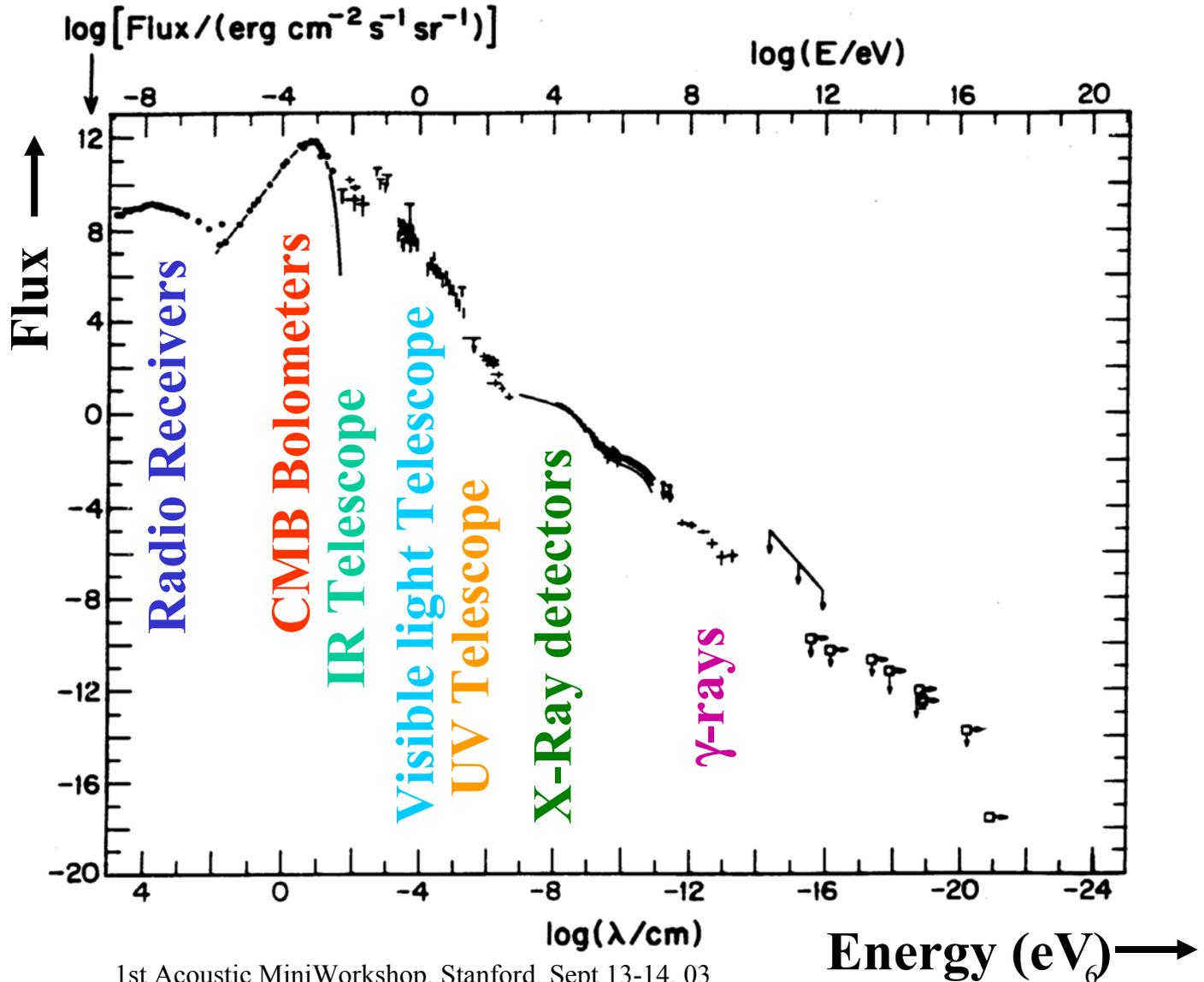
We know that new techniques invariably bring new knowledge
## ...often in ways that one would not a-priori imagine...

Fact 5

Telescope	User	date	Intended Use	Actual use
Optical	Galileo	1608	Navigation	Moons of Jupiter
Optical	Hubble	1929	Nebulae	Expanding Universe
Radio	Jansky	1932	Noise	Radio galaxies
Micro-wave	Penzias, Wilson	1965	Radio-galaxies, noise	3K cosmic background
X-ray	Giacconi ...	1965	Sun, moon	neutron stars accreting binaries
Radio	Hewish, Bell	1967	Ionosphere	Pulsars
γ-rays	military	1960?	Thermonuclear explosions	Gamma ray bursts
Water-Cherenkov	IMB, Kamioka	1987	Nucleon Decay	ν's from SN1987A
Water-Cherenkov	SuperK	1998	Nucleon Decay	$\nu_\mu \leftrightarrow \nu_\tau$ mixing ν mass
Solar Neutrino	Homestake, SuperK, SNO	2001	Solar Burning	ν_e Oscillations

After Learned, Halzen and Carr

- *Acoustic detection first discussed by*
    G.A.Askaryan
    Sov. J. Atom. Energy 3 (1957) 921

- *Extensive calculations for yield*
    in water performed by
    J.G. Learned
    Phys. Rev. D 19 (1979) 3293

- *Measurements with BNL and other*
    beams in different liquids by
    L. Sulak et al.
    NIM 161 (1979) 203

Gurgen A. Askaryan

- *Some acoustic data collected*
    by the Baikal collaboration in the last few years

- *First large data-set collected at AUTEC*

- *Wide interest by many experiments: we need a workshop !*
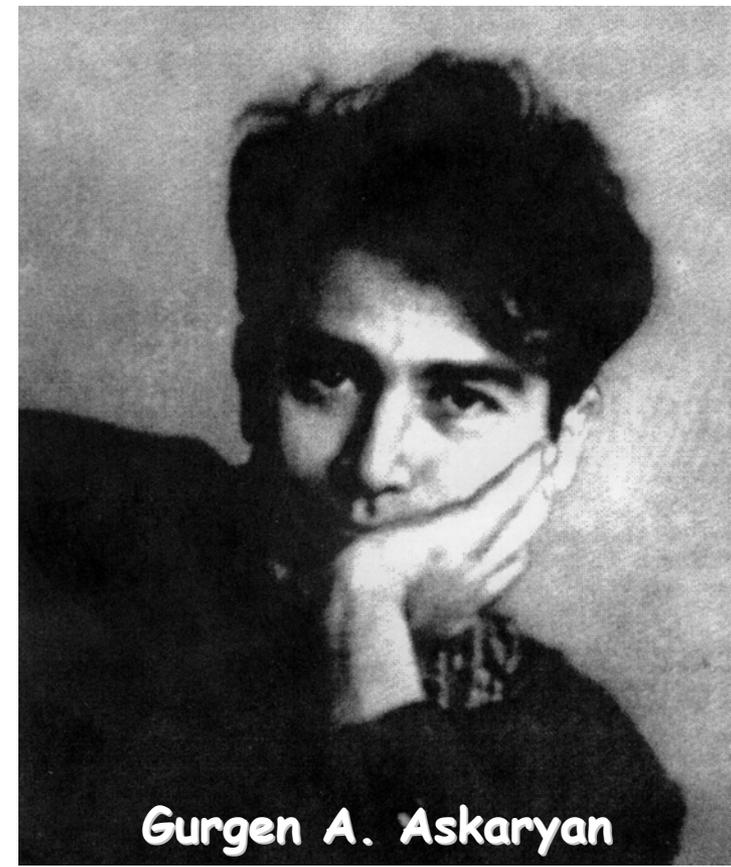
Sept 13, 2003

Time	Speaker	Topic
9:00-9:10	Giorgio Gratta (Stanford)	Welcome and logistics
9:10-9:50	John Learned (Hawaii)	Early work on acoustic detection
9:50-10:30	Buford Price (Berkeley)	Acoustical vs optical vs radio detection of neutrino-induced electromagnetic cascades
10:30-11:00	Break	
11:00-11:40	Giorgio Gratta (Stanford)	The AUTEC array as a neutrino detector
11:40-12:20	Justin Vandenbroucke (Stanford)	Analysis of the first 6 month dataset at AUTEC
12:20-2:00	Lunch	
2:00-2:40	Giorgio Riccobene (LNS Catania)	Acoustic Work at the Catania NEMO test site
2:40-3:20	Alexander Kappes (Erlagen)	Acoustic particle detection in water: activities in Erlangen
3:20-3:40	Break	
3:40-4:20	Rolf Nahnhauer (Zeuthen)	Development of Acoustic Sensors for Amanda
4:20-5:20	Mike Buckingham (SCRIPPS)	Light aircraft, propeller noise and doppler shifts: tools for underwater acoustics experiments
7:00	Dinner at Su Hong, Palo Alto	

Sept 14, 2003

9:00-9:40	Andrei Rostovstev (ITEP)	Acoustic detection work at ITEP
9:40-10:20	Chris Rhodes (Defense Science and Tech Lab, UK)	An acoustic array in the UK
10:20-10:50	Break	
10:50-11:30	Vincent Bertin (Marseille)	Plans for acoustic cosmic ray detection in Marseille
11:30-12:10	Valentin Niess (Marseille)	Acoustic tests / simulation on acoustic detection
12:10-2:00	Lunch	
2:00-2:40	David Waters (UC London)	Estimating Flux Sensitivities using a Toy Monte Carlo
2:40-3:20	Lee Thompson (Sheffield)	Acoustic detection in the UK, status and future plans
3:20-4:00	John Learned (Hawaii)	The Kamchatka array
4:00-4:20	Break	
4:20-5:00	Manfred Fink (U Texas)	Acoustic detection in salt
5:00-5:30	Final	