

CONTENTS

Preface	v
Conference Committee	vii
Introduction, History and Theory	
Early Years of High Energy Neutrino Physics in Cosmic Rays and Neutrino Astronomy (1957–1962) <i>I. Zheleznykh</i>	1
Extremely Energetic Cosmic Neutrinos: Opportunities for Astrophysics, Particle Physics, and Cosmology <i>A. Ringwald</i>	12
Comparison of GZK Neutrino Flux Calculations* <i>D. Seckel et al.</i>	
Investigation of Event Rates for Different Detector Arrays and Various Extremely High Energy Models <i>J. K. Becker and W. Rhode</i> (presented by J. K. Becker)	20
Target Material Properties	
Measurement of Attenuation Length for Radio Wave in Natural Rock Salt Samples Concerning Ultra High Energy Neutrino Detection <i>M. Chiba et al.</i> (presented by M. Chiba)	25
Acoustic Wave Propagation in Ice and Salt* <i>B. Price</i>	

*Contribution not received.

Experience on Acoustic Wave Propagation in Rock Salt in the Frequency Range 1–100 kHz and Conclusions with Respect to the Feasibility of a Rock Salt Dome as Neutrino Detector <i>J. Eisenblätter et al.</i> (presented by G. Manthei)	30
Radio Signals from Photon Beams in Sand and Salt <i>D. Williams et al.</i> (presented by D. Williams)	35
Broadband Analysis of Askaryan Pulses <i>P. Miočinović</i>	40
Simulation and Propagation of Signals	
Hybrid Scheme of Simulation of Electron-Photon and Electron-Hadron Cascades in Dense Medium at Ultra-High Energies <i>L. G. Dedenko et al.</i> (presented by L. G. Dedenko)	45
Structure Function of Excess Charge in Rock Salt <i>Y. Watanabe et al.</i> (presented by Y. Watanabe)	50
Simulations of Radio Emission from Electromagnetic Showers in Dense Media <i>J. Alvarez-Muñiz et al.</i> (presented by J. Alvarez-Muñiz)	55
Monte Carlo Simulations of Radio Emission from Cosmic Ray Air Showers <i>T. Huege and H. Falcke</i> (presented by T. Huege)	60
Simulation of Radio Signals from 1-10 TeV Air Showers Using EGSnrc <i>R. Engel et al.</i> (presented by A. A. Konstantinov)	65
Signal Processing and Background Reduction	
Scaling of Askaryan Pulses <i>D. Seckel</i>	70
Signal Processing for Acoustic Neutrino Detection in Water, Ice and Salt <i>S. Danaher</i>	75

Experience from SAUND*

J. Vandenbroucke

An Analysis Approach to Acoustic Detection of Extensive
Atmospheric Showers

D. Zaborov

87

Sensors and Transmitters

Development of Acoustic Sensors for the ANTARES Experiment

C. Naumann et al. (presented by C. Naumann)

92

Measurements and Simulation Studies of Piezoceramics for Acoustic
Particle Detection

K. Salomon et al.

97

Fiber Laser Hydrophones as Pressure Sensors

P. E. Bagnoli et al. (presented by C. Trono)

102

Development of Glaciophones and Acoustic Transmitters for Ice

S. Böser et al. (presented by S. Böser)

107

Preliminary Results on Hydrophones Calibration with Proton Beam

A. Capone and G. de Bonis (presented by G. de Bonis)

112

Experimental Results I (Acoustic)

High Frequency Noise in Lake Baikal as a Background for the
Acoustic Detection of High Energy Neutrinos

V. M. Aynutdinov et al. (presented by N. M. Budnev)

117

ITEP Investigation of Acoustic Phenomena from High Energy
Particles

V. S. Demidov et al. (presented by V. Lyashuk)

122

Testing Thermo-Acoustic Sound Generation in Water with
Proton and Laser Beams

K. Graf et al. (presented by K. Graf)

127

Results from the SAUND I Experiment*

J. Vandenbroucke

The NEMO Acoustic Test Facility <i>G. Riccobene</i>	132
First Activities in Acoustic Detection of Particles in UPV <i>M. Ardid et al.</i> (presented by M. Ardid)	137
Experimental Results II (Cherenkov Radio)	
The Upper Limit to the EHE Neutrino Flux from Observations of the Moon with Kalyazin Radio Telescope <i>R. D. Dagkesamanskii et al.</i> (presented by R. D. Dagkesamanskii)	142
Using the Westerbork Radio Observatory to Detect UHE Cosmic Particles Interacting on the Moon <i>J. Bacelar et al.</i> (presented by J. Bacelar)	147
Updated Limits on the Ultra-High Energy (UHE) Neutrino Flux from the RICE Experiment <i>I. Kravchenko et al.</i> (presented by D. Besson)	153
The ANITA Cosmogenic Neutrino Experiment <i>P. W. Gorham et al.</i> (presented by P. Miocinovic)	158
Measuring the Neutrino-Nucleon Cross Section with SaLSA <i>A. Connolly</i>	163
Experimental Results III (Air Shower Radio)	
Radio Detection of Cosmic Rays with LOPES <i>A. Horneffer et al.</i> (presented by H. Falcke and A. Horneffer)	168
Combined LOPES and KASCADE-GRANDE Data Analysis <i>A. Haungs et al.</i> (presented by A. Haungs)	182
Absolute Calibration of the LOPES Antenna System <i>S. Nehls et al.</i> (presented by S. Nehls)	187
CODALEMA: A Cosmic Ray Air Shower Radio Detection Experiment <i>D. Ardouin et al.</i> (presented by R. Dallier)	192

Future Projects I

- The Converted Hydroacoustic Array “MG-10M” — A Basic Module for a Deep Water Neutrino-Telescope
Y. Karlik and V. Svet (presented by V. Svet) 197
- A Device for Detection of Acoustic Signals from Super High Energy Neutrinos
V. M. Aynutdinov et al. (presented by L. V. Pan'kov) 202
- The UK-ACoRNE Group: Present Projects and Future Plans*
S. Danaher
- ACoRNE Simulation Work
J. Perkin 207
- Design Considerations and Sensitivity Estimates for an Acoustic Neutrino Detector
T. Karg et al. (presented by T. Karg) 212

Future Projects II

- Study of Acoustic Ultra-High Energy Neutrino Detection Phase II
N. Kurahashi 217
- SPATS — A South Pole Acoustic Test Setup
S. Böser et al. (presented by S. Böser) 221
- Integration of Acoustic Detection Equipment into ANTARES
R. Lahmann et al. (presented by R. Lahmann) 227
- Overview of the LORD Experiment (Lunar Orbital Radio Detector)
V. A. Chechin et al. (presented by V. A. Tsarev) 232
- Concept of the LORD Experiment
V. A. Chechin et al. (presented by V. A. Chechin) 237
- Advanced Detection Methods of Radio Signals from Cosmic Rays for KASCADE Grande and Auger
H. Gemmeke et al. (presented by H. Gemmeke) 242

Future Projects III

Neutrino Detection in Salt Domes under LOFAR <i>A. M. van den Berg</i>	247
Introduction to the SalSA, A Saltdome Shower Array as a GZK Neutrino Observatory (abstract only) <i>D. Saltzberg</i>	252
Neutrino Flavor Identification in SalSA <i>P. Miočpinović</i>	254
Simulation of a Hybrid Optical/Radio/Acoustic Extension to IceCube for EHE Neutrino Detection <i>J. A. Vandenbroucke et al.</i> (presented by J. A. Vandenbroucke)	259
Round Table Discussion	
ARENA Round Table Discussion Summary <i>R. Nahnauer</i>	265
Conference Summary	
ARENA 2005 Conference Summary <i>J. G. Learned</i>	269
ARENA Workshop Pictures	281
List of Participants	293