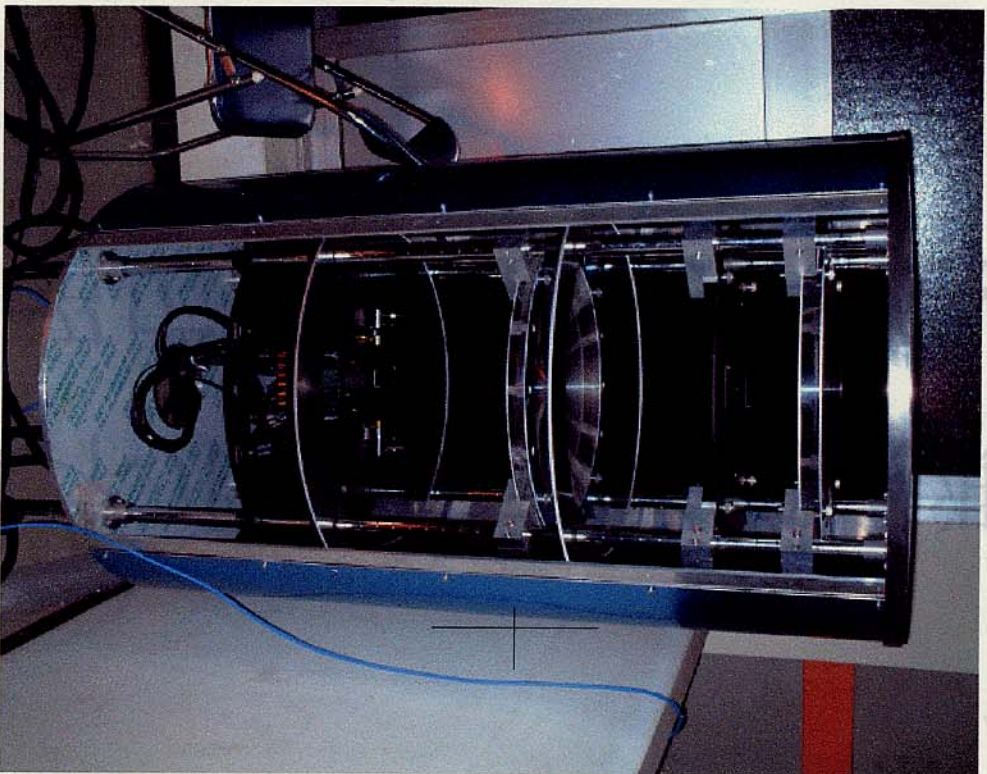
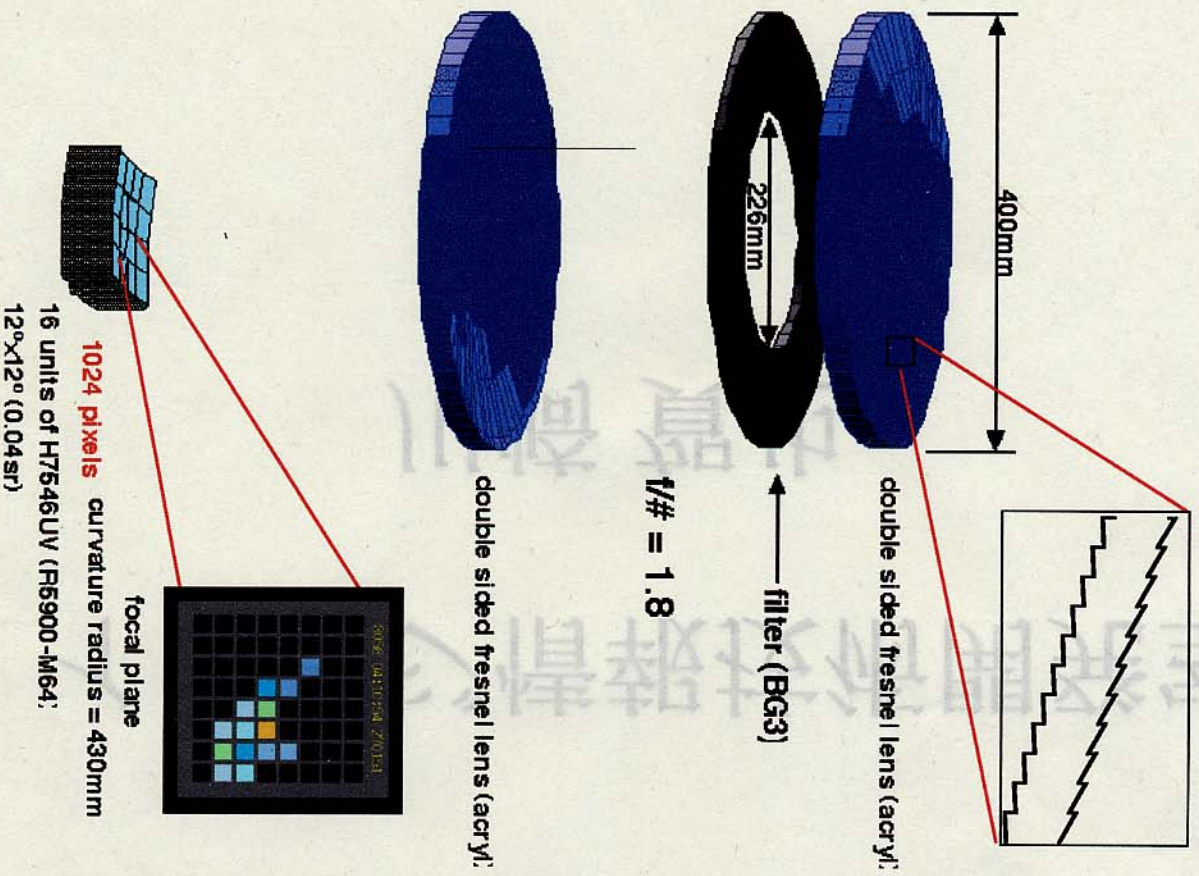


Cline & Stecker astro-ph/0003459

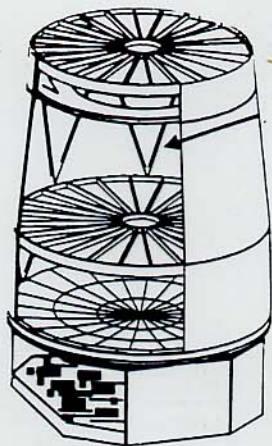


20 km

Small-scale Prototype



EUSINETTO...



For Cerenkov light from point sources

40 cm optics = $0,13 \text{ m}^2 \Rightarrow 250 \text{ pe} / 10 \text{ ns}$

Large field of view $\sim 1 \text{ sr}$

observing G.C. Mkr ...

\Rightarrow limit on neutrino flux

$$\phi \lesssim 10^{-12} / \text{cm}^2 \text{ s}$$

in ~ 100 hours

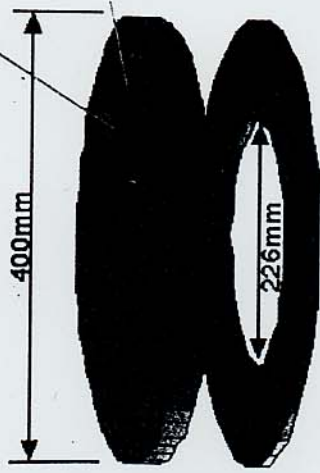
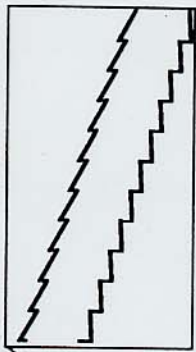
With 1000 px occupancy 25%

Threshold 10σ shower $5 \cdot 10^{13} \text{ eV}$
(20 km)

Background $10^{-6} \Rightarrow 1$ in 10^7 ns

2 telescopes in coincid $\Rightarrow 1$ in 3 hours

EUSIN(ETTO)



double sided fresnel lens (acryl):

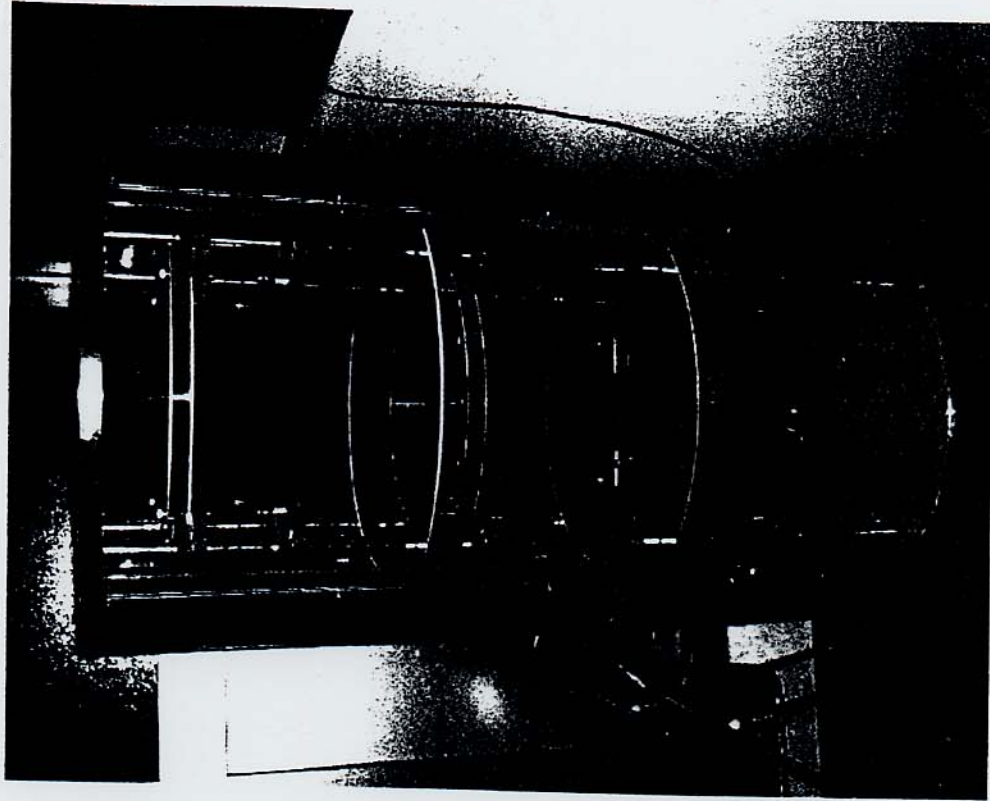
filter (BG3)

$f/\# = 1.8$

double sided fresnel lens (acryl):



focal plane
 10,23 pixels curvature radius = 430mm
 16 units of H7546UV (R5900-M64;
 12°x12° (0.04sr)



GZK NEUTRINOS

Range $10^{17} \rightarrow 10^{20}$ eV

Technique : fluo + Č Flash

Telescope observing

40 km^2 , 1 sr

during $3 \cdot 10^6$ s

→ 10 events (ν_e)

Good angular resolution < 10 mrad

Direction

Correlation (GRB?)

• $\nu_e \rightarrow e$

Landau-Pomeranchuk-Migdal

when e energy $\gtrsim 10^{16}$ eV

$\lambda \sim 30$ m of rock

• $\nu_\mu \rightarrow \mu$

Catastrophic brems

10^{16} eV $\lambda \sim 100$ m (loses 10%)

then loses $\sim 10^{14}$ eV in 10 km atm

• $\nu_\tau \rightarrow \tau$

$ct_\tau = 87 \mu\text{m}$

$$\delta c\tau = 500 \text{ m} \times \frac{E}{10^{16} \text{ eV}}$$

limited by photonuclear σ

goes up to 30 km

ν_τ by oscillations!

FLUO + CERENKOV



Seuil $N_8 \times 4.10^{-10}$ 108 \AA à 5.10^{16} eV
(Threshold)

FLUORESCENCE



$108 \text{ \AA} \quad 7.10^{16} \text{ eV}$

Seuil
(Threshold)

Cible
(Target)

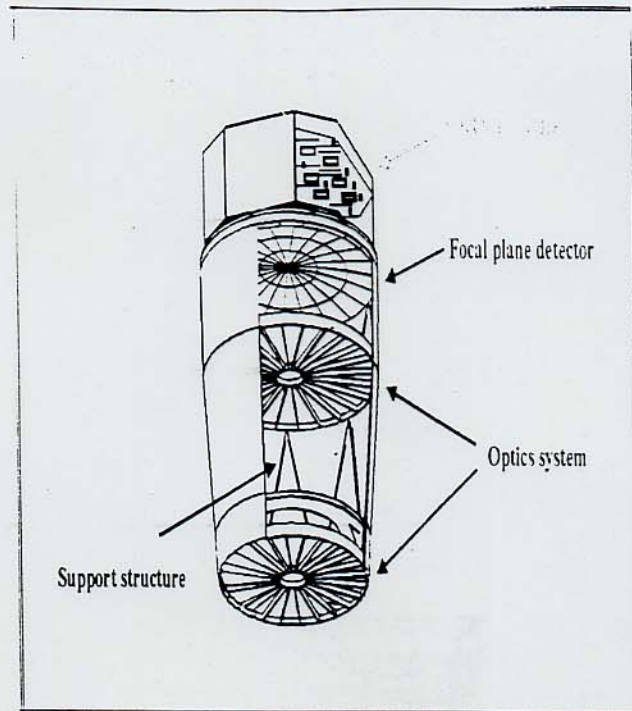
CERENKOV



Seuil 10γ à $3.5 \cdot 10^{12} \text{ eV}$
(Threshold)

Cible $23 \text{ km} \times 10 \text{ km} \times \lambda \times 10^{-3} \text{ srd}$
(Target)

EUSINO...



. Optics 1 m diameter

. Focal plane

200 photoel / ns

MAPMT's 10 ns

10% random occup
with 20 000 pixels

. 2 telescopes in coincidence

stereo

