

Aspen Winter Conference
on
Gravitational Waves and Their Detection

4 – 11 February, 2001

Aspen, Colorado, USA

EURO Status Report

Albrecht Rüdiger

Max-Planck-Institut für Quantenoptik

D – 85748 Garching bei München

8 February 2001

Tel: +49 89 32905-265

e-mail: atr@mpq.mpg.de

Fax: +49 89 32905-200

WWW: <http://www.geo600.uni-hannover.de>

EURO Status Report

could be cynical :

status could be expressed **in three letters:**

STATUS Q U O

it is true :

strong pressure to commission present detectors
(in Europe: **VIRGO** and **GEO 600**)
absorbs much of funds, man-power

nevertheless, far-reaching activities going on :

political activity to secure **EURO** project
MoU signed last month
studies under way in some areas
current collaborations with impact on **EURO**
experimental research in some labs
to be strengthened in near future

give a brief (10 minute) overview

Future Large Scale Antennas

LIGO II: MIT, CalTech, ...

G. Sanders

definition of project quite well progressed

use existing sites (Hanford, WA; Livingston, LA)

4 km arms

rely on room-temperature technique

triple suspension

massive mirrors

signal recycling or RSE

LCGT: KEK, NAO, U Tokyo, ...

T. Suzuki

definition of project quite well progressed

3 km arms

cryogenic mirrors

cryogenic suspension ?

deep underground (Kamioka)

LISA: NASA, ESA, ...

R. Stebbins

definition of project quite well progressed

50 million km arms

in space (Earth orbit)

ultra-low frequencies

Future Large Scale Antennas, ctd.

EURO: CNRS, INFN, MPG, PPARC A. Rüdiger

(10 minute talk)

details of project not yet fully determined

probable features, possible options, long shots:

- i 3 km arms
- i signal recycling / RSE
- i deep underground
- i cryogenic susp./mirrors
- i new mirror materials
- i kW laser
- i diffractive optics
- i QND
- i squeezed states

The EURO Gravitational Wave Antenna

Conception :

Four European funding bodies met in May 1999

CNRS	France
INFN	Italy
MPG	Germany
PPARC	United Kingdom

Concept :

Sensitivity limited only by quantum effects

Frequency range determined by most promising sources

Assessment by expert panel by end of 1999

Phase-A Study to deliver results by end of 2001

Funding within 200 M Euro frame (\approx 200 M\$)

Chores :

Seismic noise + Gravity gradient noise

Thermal noise (suspension, internal; cooling)

Diffraction optics

Materials (optical, mechanical properties)

Contamination

Laser (power, frequency)

Signal recycling, RSE

The Schedule for **EURO**

Roadmap for Gravitational Wave Detectors :

- 2001** **LIGO** and **GEO 600** go in operation
in their baseline configuration
start taking (and exchanging) data
- 2002/3** **VIRGO** goes in operation
excellent low-frequency seismic isolation
use monolithic suspension as in **GEO**
- 2004** **GEO 600** used for 3rd generation tests
investigate vital changes for **EURO**
- 2005** Signal recycling, from **GEO 600** to **VIRGO**
giving it tunability for special sources
giving it superior high-frequency sensitivity
- 2006** **LIGO II** goes in operation
based partly on European technology
- 2008** start of **EURO** construction
aiming at ultimate sensitivity
allow to see BH binaries to end of Universe

in line with MoU of January 2001: "inside this decade"