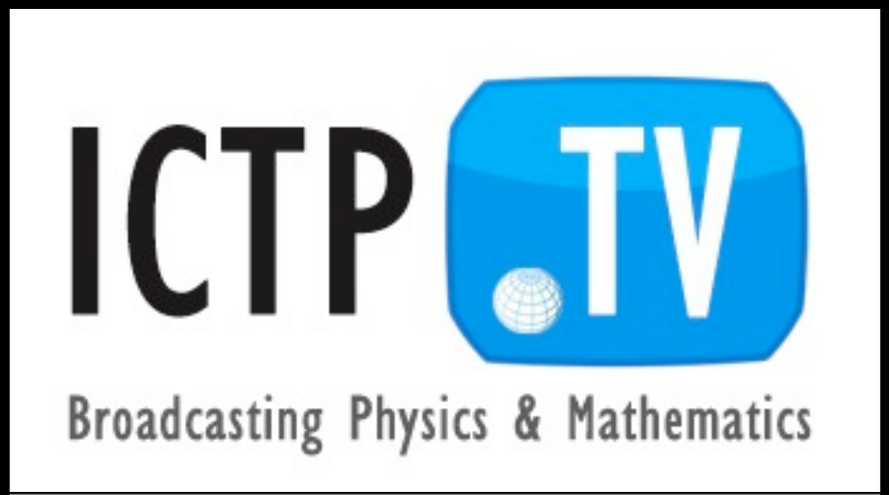
E. Canessa, M. Zennaro and C. Fonda
ICTP Science Dissemination Unit
http://sdu.ictp.it

Diploma Course On-line



TAGS:
#ictp #sdu #eya
#sciencedissemination

CONTACT:
EMAIL: cfonda@ictp.it
TWITTER: @carlofonda

ICTP SDU

The Science Dissemination Unit has been created in late 2004 with the broad aim of **disseminating ICTP scientific contents and programs to more people than are able to visit the Centre**, throughout the world, via electronic, digital, satellite and other information and communication tools.

What SDU does

Workshops on ICT

Open Source for Science

Digital Lectures

iRooms

eJDS

PingER

Open Access (African Physical Review, e-Print Archive)

Digital Lectures

- In 2004, we started to think on how to create a web archive of video recordings of seminars delivered at ICTP by renowned guests.

Tsunami Physics and Preparedness
March 24, 2005

Selected lectures from the special workshop organized by the ICTP SAND Group (Structure and Non-Linear Dynamics of the Earth) after the tragic Tsunami event of December 2004.

The Wobbly Wind
March 23, 2005

Scientific talk on physics of thermal convection, given by ICTP Director Prof. Katepalli R. Sreenivasan for the SISSA Colloquium Series.

ICTP Dirac Medal 2004
March 16, 2005

The 2004 Dirac Medal of the ICTP awarded to James D. Bjorken and Curtis G. Callan during an award ceremony hold at the Centre on Wednesday, March 16, 2005.

Three-fold way

Those three are complementary solutions!

live	*archive*	*archive*
video-conference or webcast	**support material (pdf, ppt)**	**A/V recording + slides**
Skype *IE + PPT*	*ICTP Agenda (database)*	*few* *(post-processing)* *EyA* *(automatic)*

Examples of DL

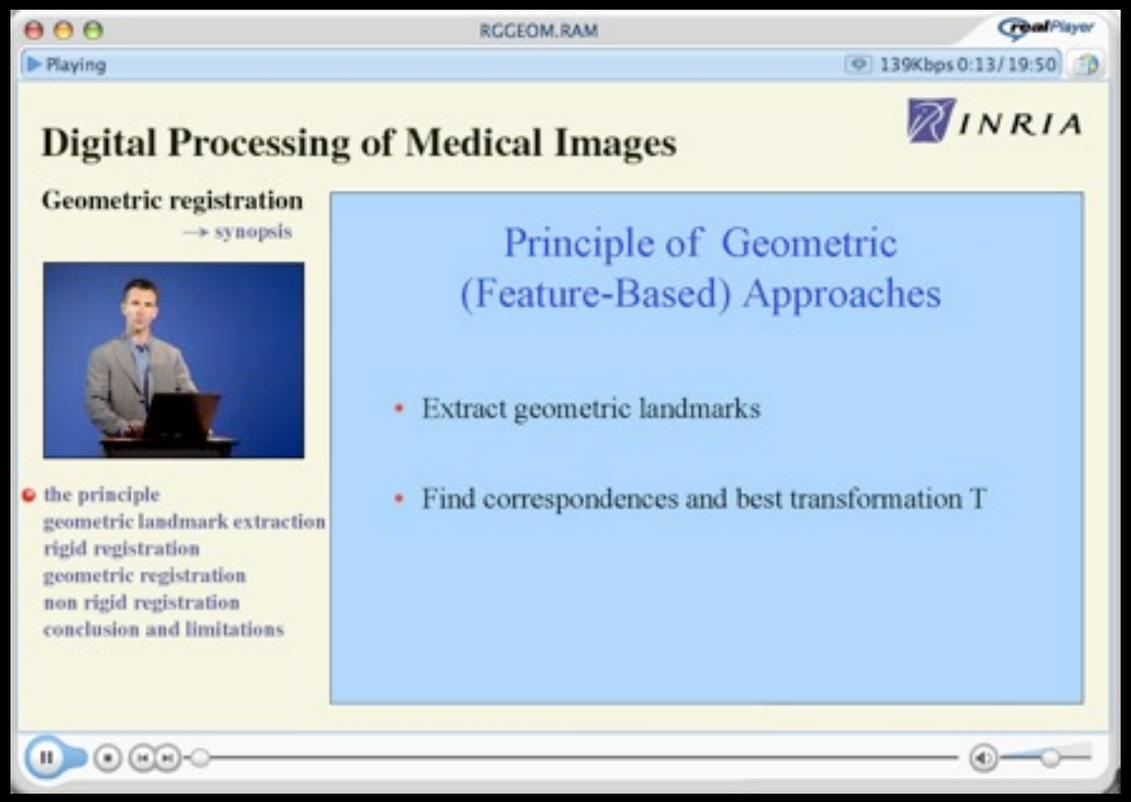
MIT:

- RealVideo
- Bandwidth Selection
- No Slides
- No download
- Post-processed

Examples of DL

INRIA:

- RealVideo+XML-SMIL
- Synchronized Slides
- Post-processed



Examples of DL

ePresence:

- Multi Formats
- Audio only option
- Synchronized Slides
- Post-processed

Dissolving Boundaries. KMDI series (March 2006)

Archive	Presenter	Viewed	Watch
March 9, 2006 Parallel Worlds: The evolution of real and virtual communities	Rodney Hoinkes and Stacey Spiegel	311 times	WM Real QT MP3
March 23, 2006 Beyond Ryan Due to technical difficulties this archive is incomplete – slides are missing from Chris Landreth's talk. This will be repaired shortly.	Chris Landreth & the Ryan crew from Department of Computer Science, UofT	115 times	WM Real QT MP3
March30, 2006 Body image : Image of the body	Shannon Bell & Johanna Householder	78 times	WM Real QT MP3

Examples of DL

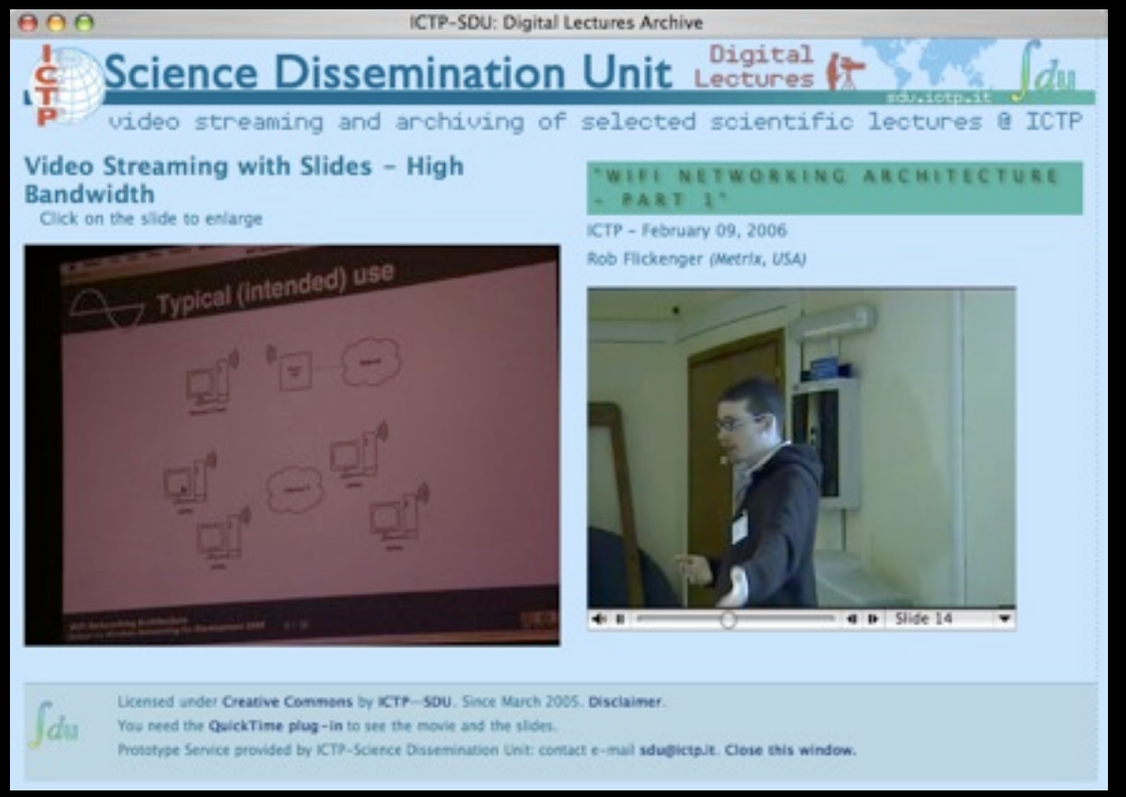
Cambridge:

- Quicktime
- No Slides
- Post-processed

Examples of DL

ICTP-SDU (I st version, 2005):

- Quicktime
- Audio only option
- Synchronized Slides
- Minimal post-processing
- Downloadable



THE problem

- "Our research so far has shown that making streaming video presentations accessible - increases staff time by an additional factor of up to fifty.

  The cost of outsourcing this service at 100% content accuracy is about $250 to $350 per hour of video."

  [http://www.utexas.edu/computer/grants/di4/cit/cit.html]

- "...that the key problem of recording is that it is necessary to have one person in the room to follow the lecture/recording equipment or even 3 or more persons depending on the number of lectures going on simultaneously." [ICTP referee report for an SDU workshop]

Our problem

ICTP has:

4 rooms for the Diploma Programme

7 main conference halls (40 to 300 seats) across the campus

... that sum up to:

9 x 300$ = **2700$/hour**

11 x 2700$ = **29700$/day**

20 x 29700$ = **594K$/month**

Our approach

- To have a Digital Lectures system which has:
  - ✓ high-quality
  - ✓ no human intervention
  - ✓ non invasive approach
  - ✓ low cost of equipment

plus few additional requests:

- ✓ continuous service with minimal maintenance
- ✓ low-bandwidth friendly features (zip, CD/DVD)
- ✓ compatible with all web browsers and Operating Systems

Boundary conditions

- Scientific lectures given mostly by physicists (blackboard, tranparencies, PowerPoint slides, whatever...)
- Different types of room are used for lecturing, staff for recording/assistance is not always available:
  - *from the Main Lecture Hall (huge, with some assistence) to small unattended rooms*

John Nash at ICTP, 2004

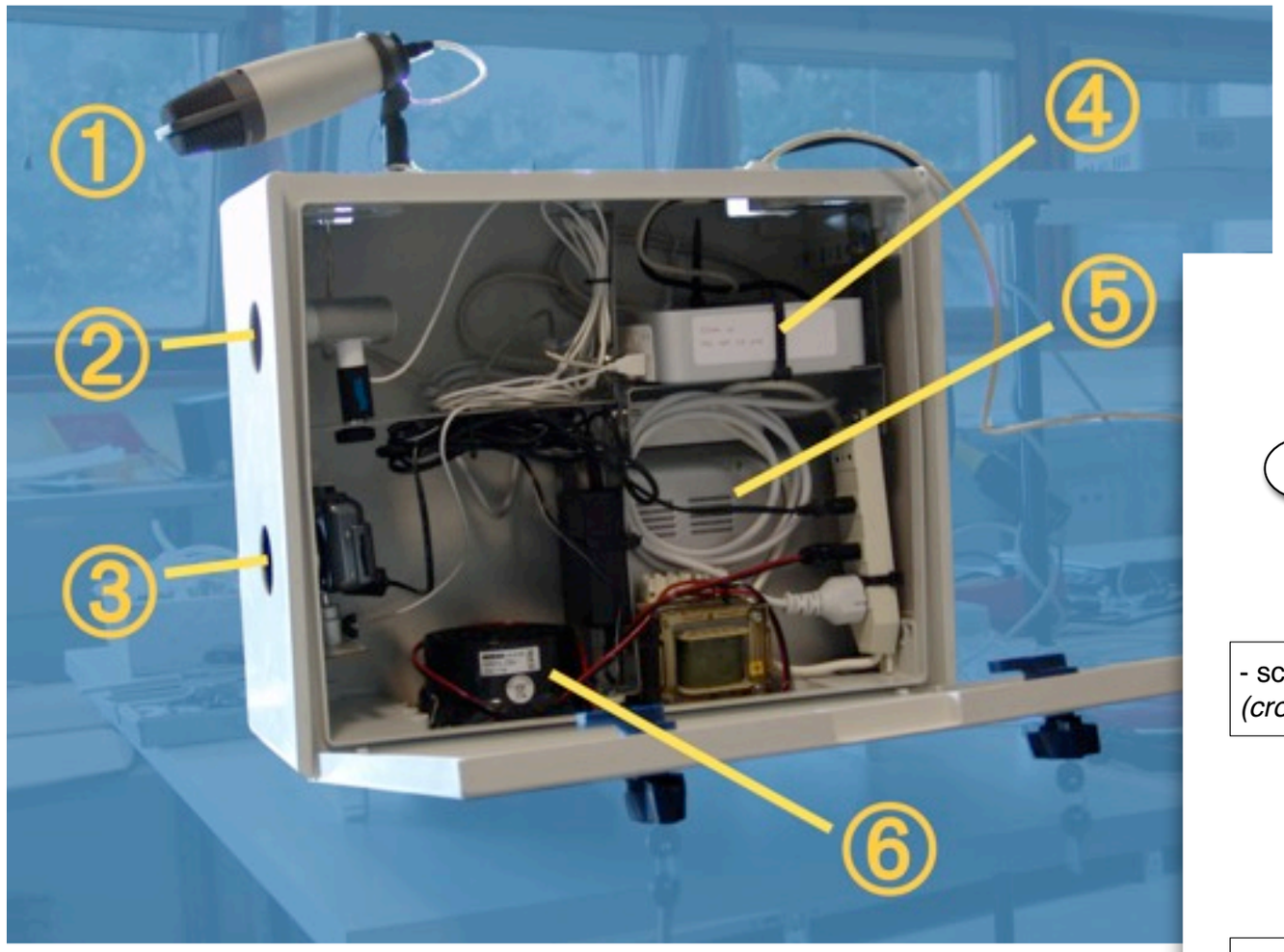
one innovative solution

2007 version of EyA

- started to test different versions, recorded talks and selected courses in 2005-07
- 6 months of work for development and test
- deployed in 3 rooms (Diploma Programme), for intensive use (8 hours/day, monday-friday/saturday)
- added also a mobile unit
- ‘08: one more lecture room (Kastler @ AGH) for tests

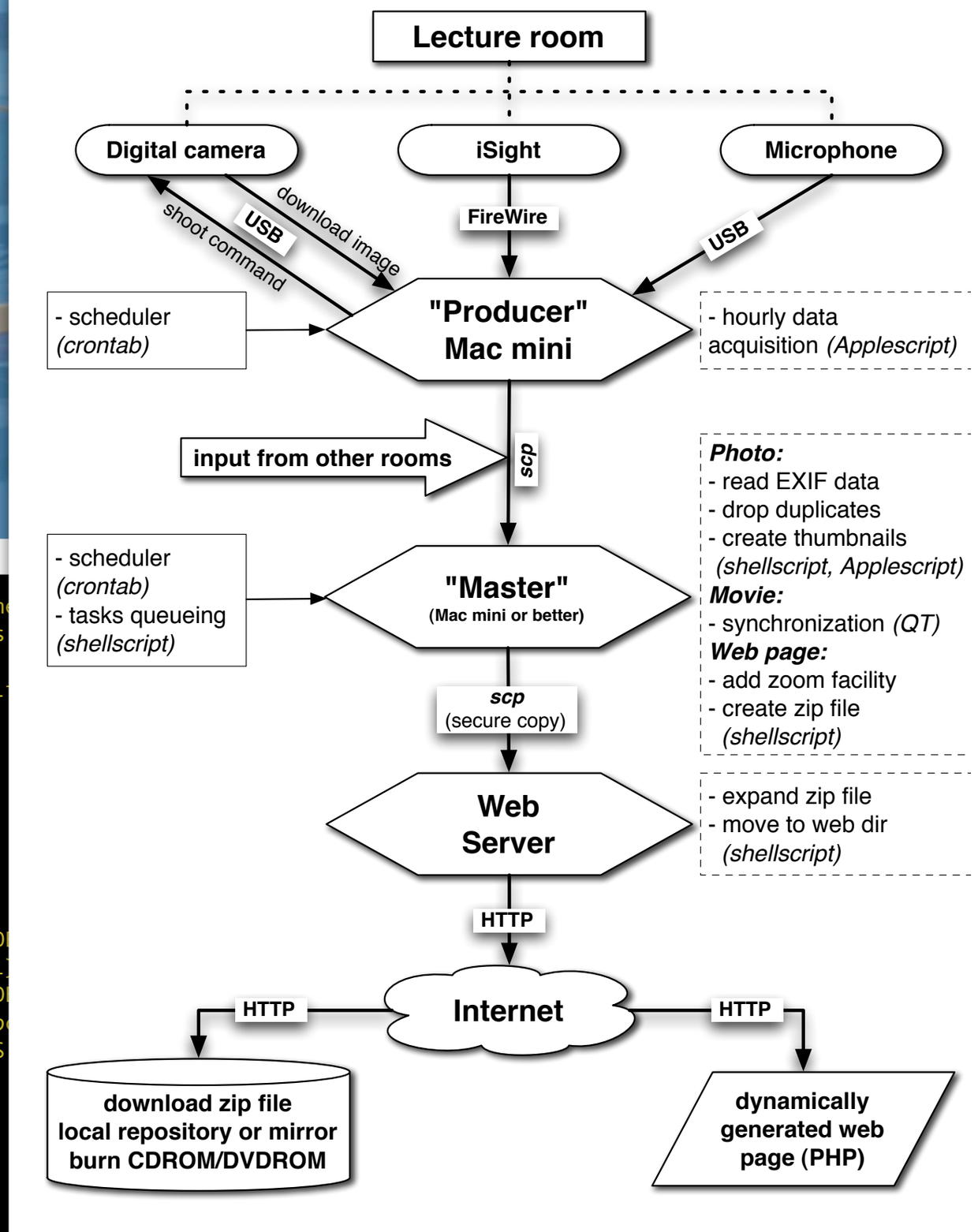
Our solution: EyA

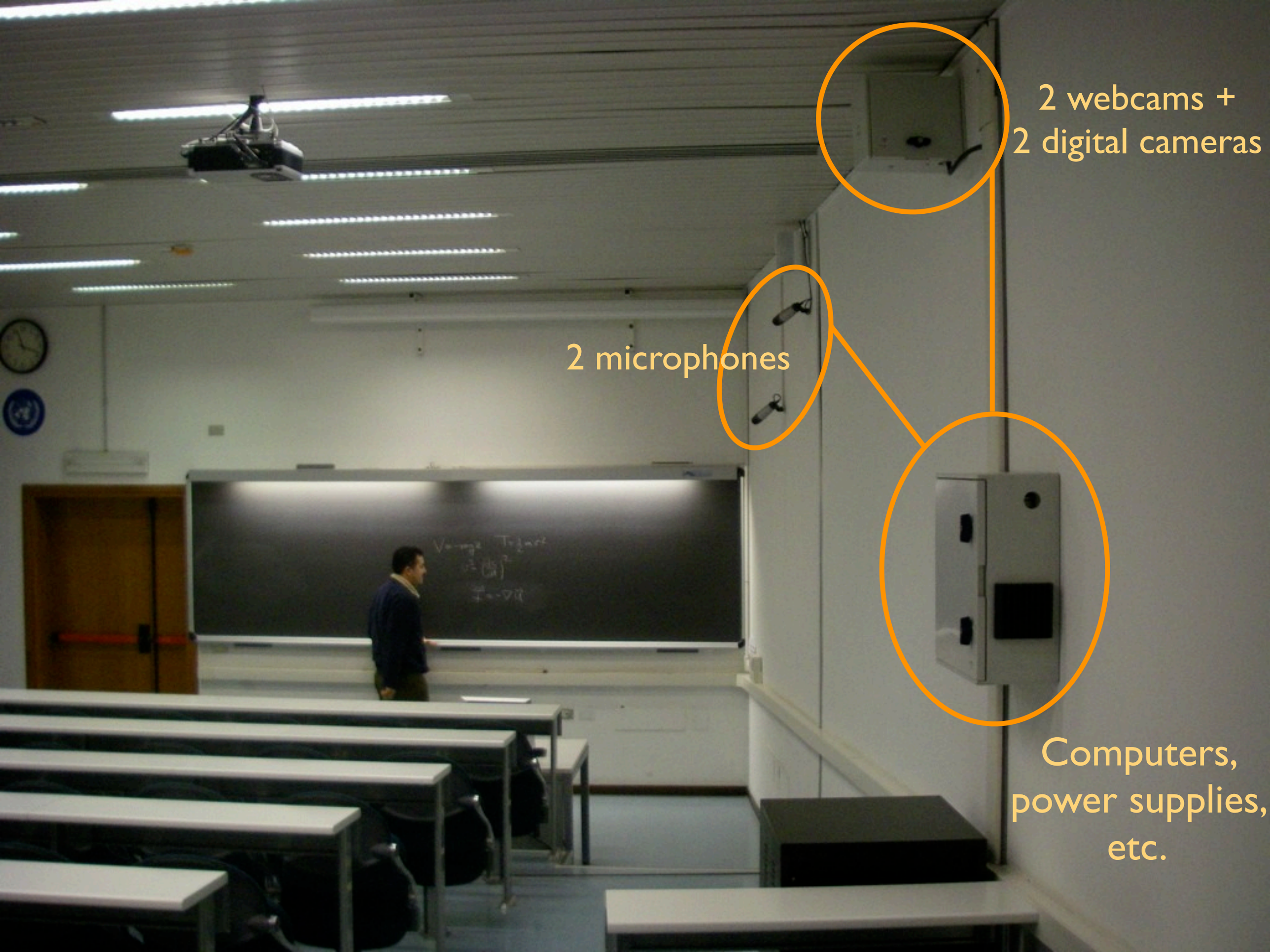
- EyA (Enhance your Audience ;-) has 3 parts:
  - hardware (Mac computer, cheap webcam, cheap digital camera, USB microphone, ...)
  - software (free or cheap sw components, some have been developed at ICTP, some are provided free with the hardware)
  - system integration + network

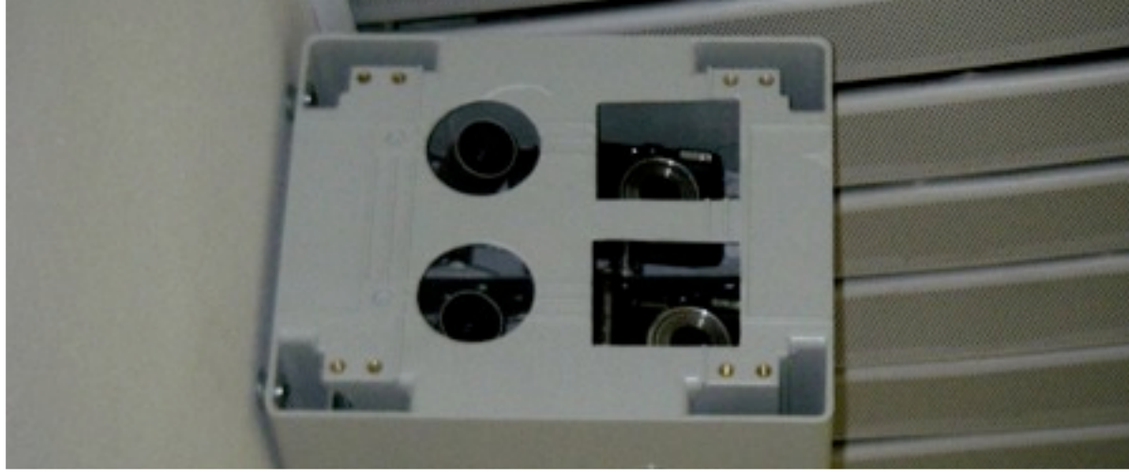



```
if test $SLIDEOFFSET_ALLSEC -ge $T_LENGTH_SEC # when the slides are going after th
  then echo "* WARNING on image $A.jpg: Offset is $SLIDEOFFSET_ALLSEC sec, that is
    if [ $LASTA -eq $SLIDES ]
        then LASTA=$A # if we did not changed it before (i.e. this is the first sl
he movie), let's change it now
    fi
    rm -f "$S_PATH/$A.jpg" # delete the small image file
    rm -f "$OUT_PATH/big/$A.jpg" # delete the big file
    continue # go to the next iteration of the loop
  fi

  SLIDEOFFSET_SEC=$(echo "scale=0; $SLIDEOFFSET_ALLSEC % 60" | /usr/bin/bc -l)
  SLIDEOFFSET_SEC="00$SLIDEOFFSET_SEC" ; SLIDEOFFSET_SEC=${SLIDEOFFSET_SEC:${#SLID
  SLIDEOFFSET_MIN=$(echo "scale=0; ($SLIDEOFFSET_ALLSEC/60) % 60" | /usr/bin/bc -l
  SLIDEOFFSET_MIN="00$SLIDEOFFSET_MIN" ; SLIDEOFFSET_MIN=${SLIDEOFFSET_MIN:${#SLID
  SLIDEOFFSET_HOURS=$(echo "scale=0; ($SLIDEOFFSET_ALLSEC/3600) % 60" | /usr/bin/b
  SLIDEOFFSET_HOURS="00$SLIDEOFFSET_HOURS" ; SLIDEOFFSET_HOURS=${SLIDEOFFSET_HOURS
-2:2}
  SLIDETIME=$SLIDEOFFSET_HOURS:$SLIDEOFFSET_MIN:$SLIDEOFFSET_SEC.00
```




2 webcams +
2 digital cameras
2 microphones
Computers,
power supplies,
etc.




redundant system

How does EyA work?

- during the talk:
  - audio/video recording
  - it also takes photos of the “wall”

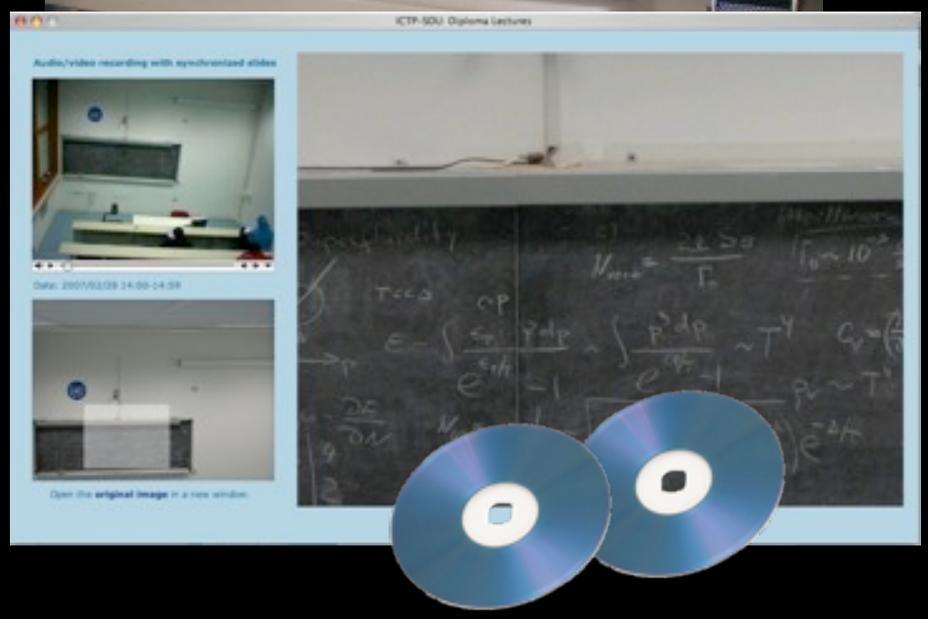

Superfluidity
1) Superfluid II
2) Weak int. BEC
3) Magnetism III

Enhance your Audience (EyA)

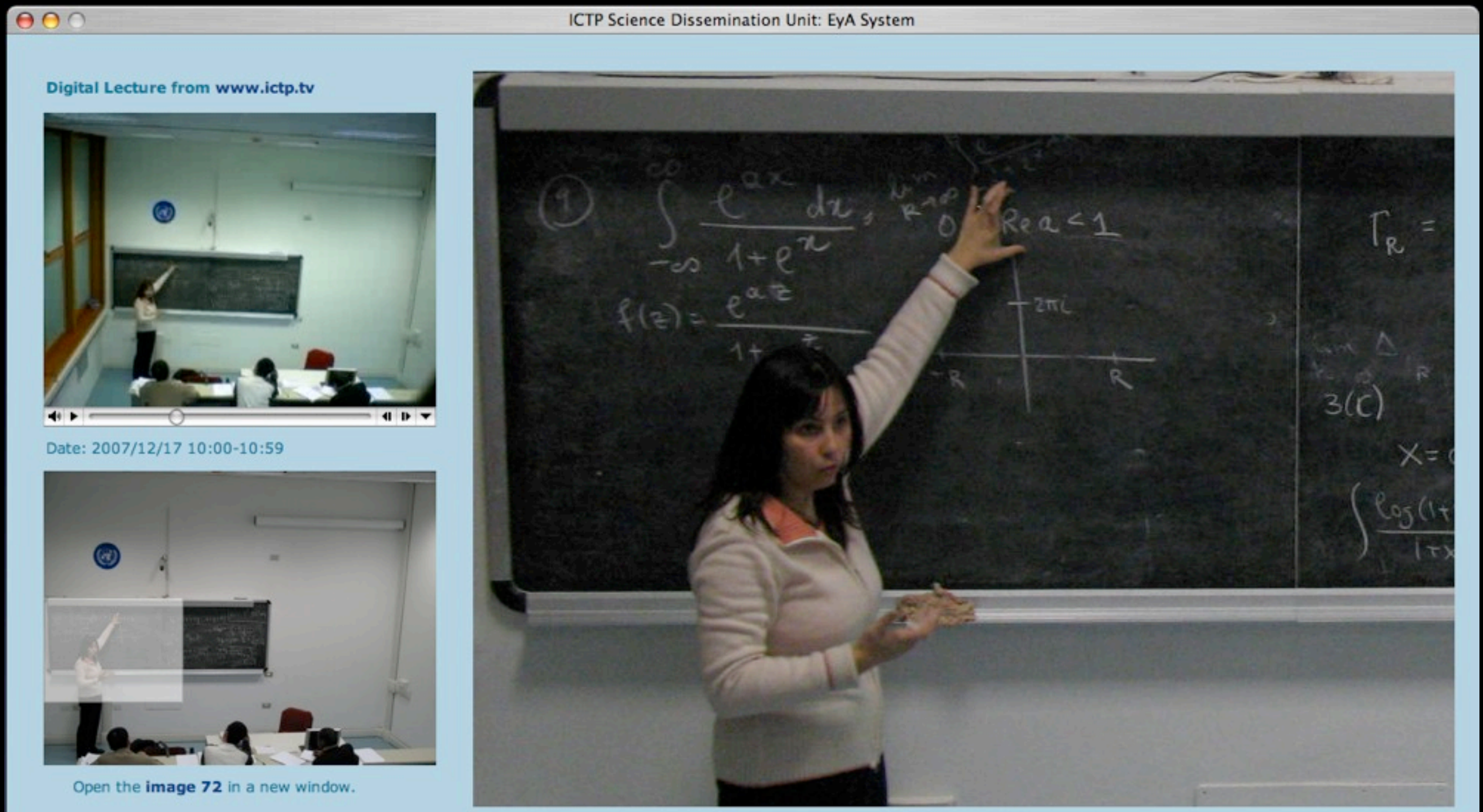
- during the talk:
  - audio/video recording
  - it also takes photos of the "wall"

  ☞ no human intervention here!
- file transfer to server for processing
- immediately after the talk:
  - synchronization of photos (slides, blackboard, ...) with the video
  - making of a web page (+ zip file)
  - making of CD/DVD

  ☞ no human intervention here too!



The output


ICTP Science Dissemination Unit: EyA System
Digital Lecture from www.ictp.tv
Date: 2007/12/17 10:00-10:59
Open the image 72 in a new window.

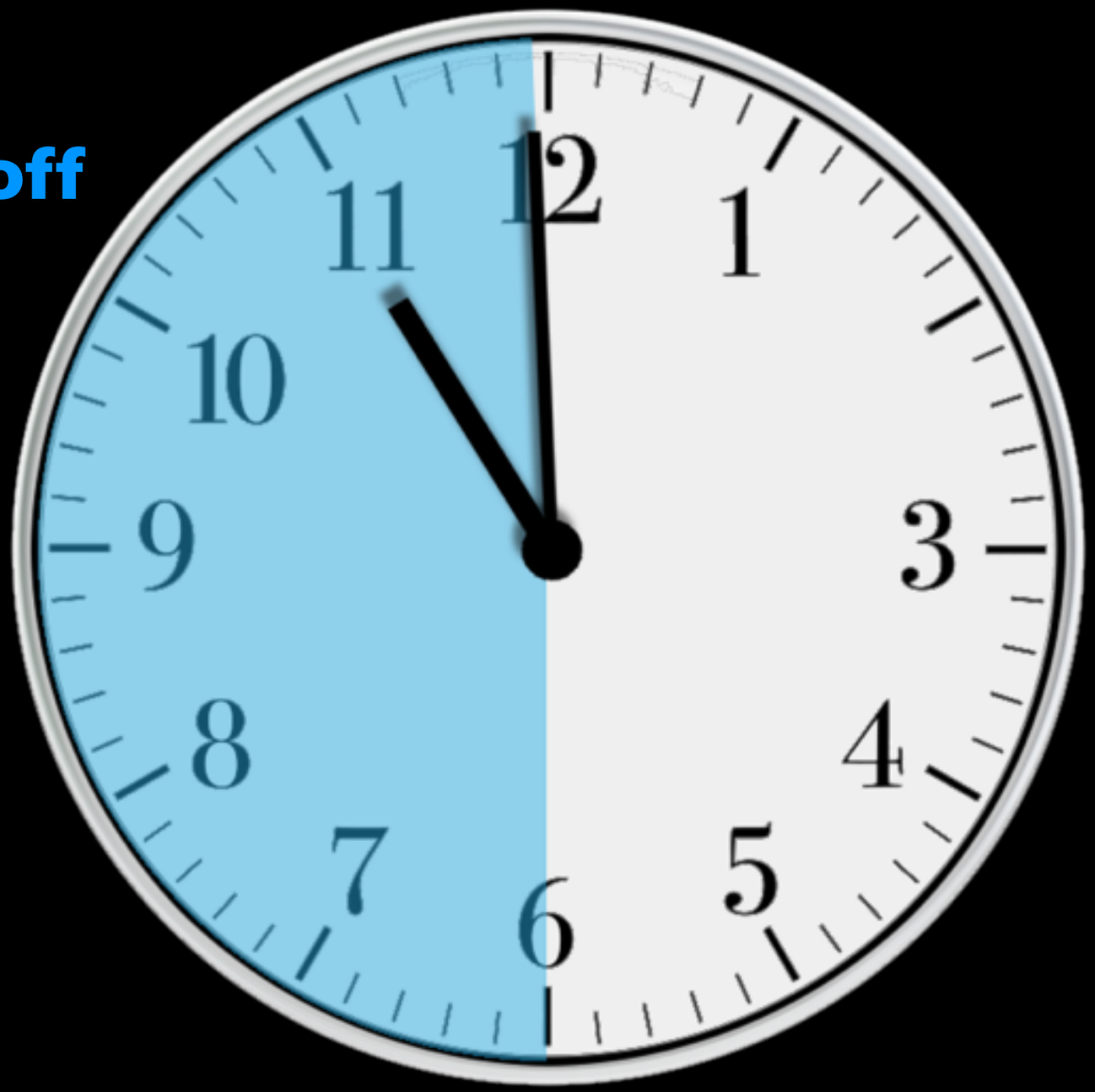
“Near Real-Time”

“Near Real-Time”

REC on

“Near Real-Time”

REC off



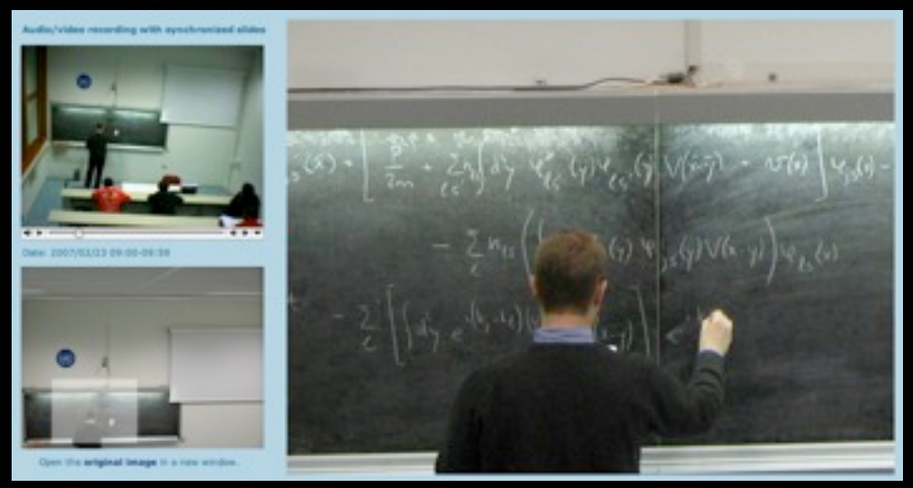
“Near Real-Time”

copy all files

server

“Near Real-Time”

http://www....



published on the web

post-processing

Moving ahead

- new **enhancements** (technology-related):
  - touch-screen toaster
  - tagging, data mining
- institutional **policies** (decisions to be taken):
  - wide adoption
  - **www.ictp.tv**
  - administration
  - intellectual property

Discussion: costs

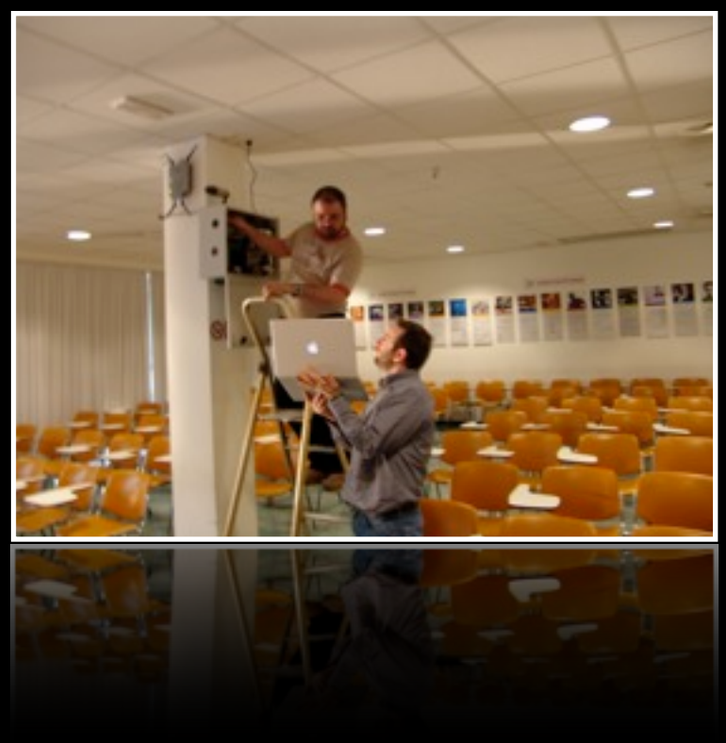
- low cost for system development (done)
- low cost for installation
  ~ 2500 €/room
  1 – 5000 € for servers
- no cost for maintenance and management *(maybe the replacement of digital cameras...)*

Discussion: technology

- Apple computers (OSX)
  - ➡ **QuickTime, Flash**, Applescript, shell scripts, ...
- bandwidth optimization
  - ➡ image comparison to cut duplicate images
- EXIF data from JPEGs
  - ➡ used to synchronize video and images

options/versions

- fixed unit *or* mobile unit (laptop)
- basic system *or* redundant (double) system
- with *or* without an independent server for post-processing



NEW: OPEN VERSION

- simpler, easier, free: OpenEyA
- www.openeya.org
- Linux-based (Ubuntu), runs on netbooks
- graphical user interface, both “click to record” and “programmable alarms”

openEyA Webcasting of Traditional Chalkboard Lectures

Search

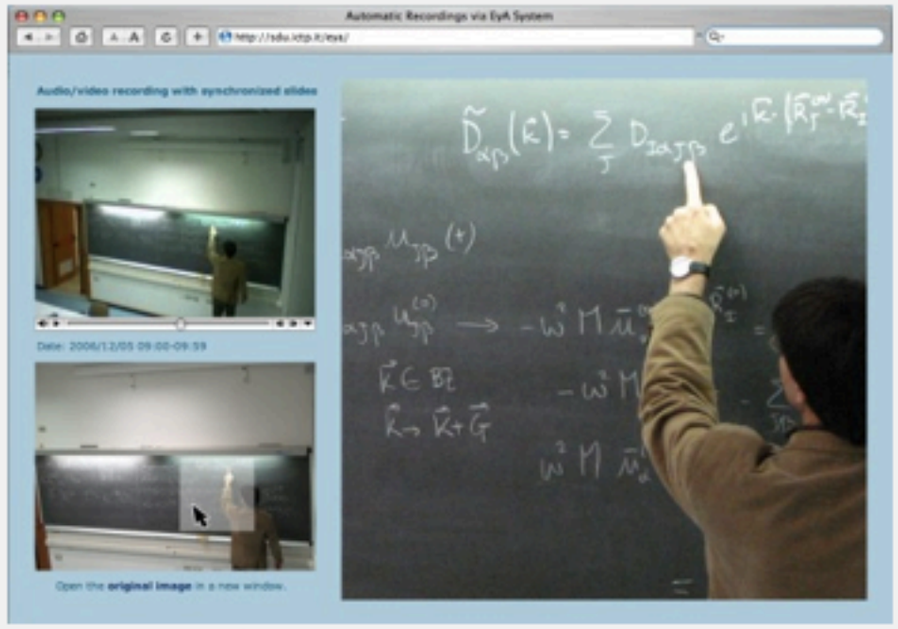
Home | Requirements | Examples | Manual | Research | Contact

About

> **We are glad to announce a new release of openEyA version 1.0.1 which is now available for free download!**

openEyA is the Linux-based alternative to the automated EyA recording system also developed by the ICTP Science Dissemination Unit (SDU). **openEyA** integrates different technologies under Linux O.S. (Ubuntu) to synchronize:

1. video in Flash format (to see whatever happens in front of a classroom), -see examples
2. high resolution digital photos (to zoom specific areas of the classroom podium, blackboard and projector screen -if any) and
3. classroom audio (without the need to wear a microphone).



Snapshot of EyA in action (click to zoom)

EyA stands for *"Enhance your Audience"*. It is being used to record

News

- New relase openEyA 1.0.1 now available

Download

GET openEyA

Source code

- doxygen source documentation
- GUI screenshots
- SourceForge.net

Case studies

- Diploma Course on-line: www.ictp.tv

openEyA links

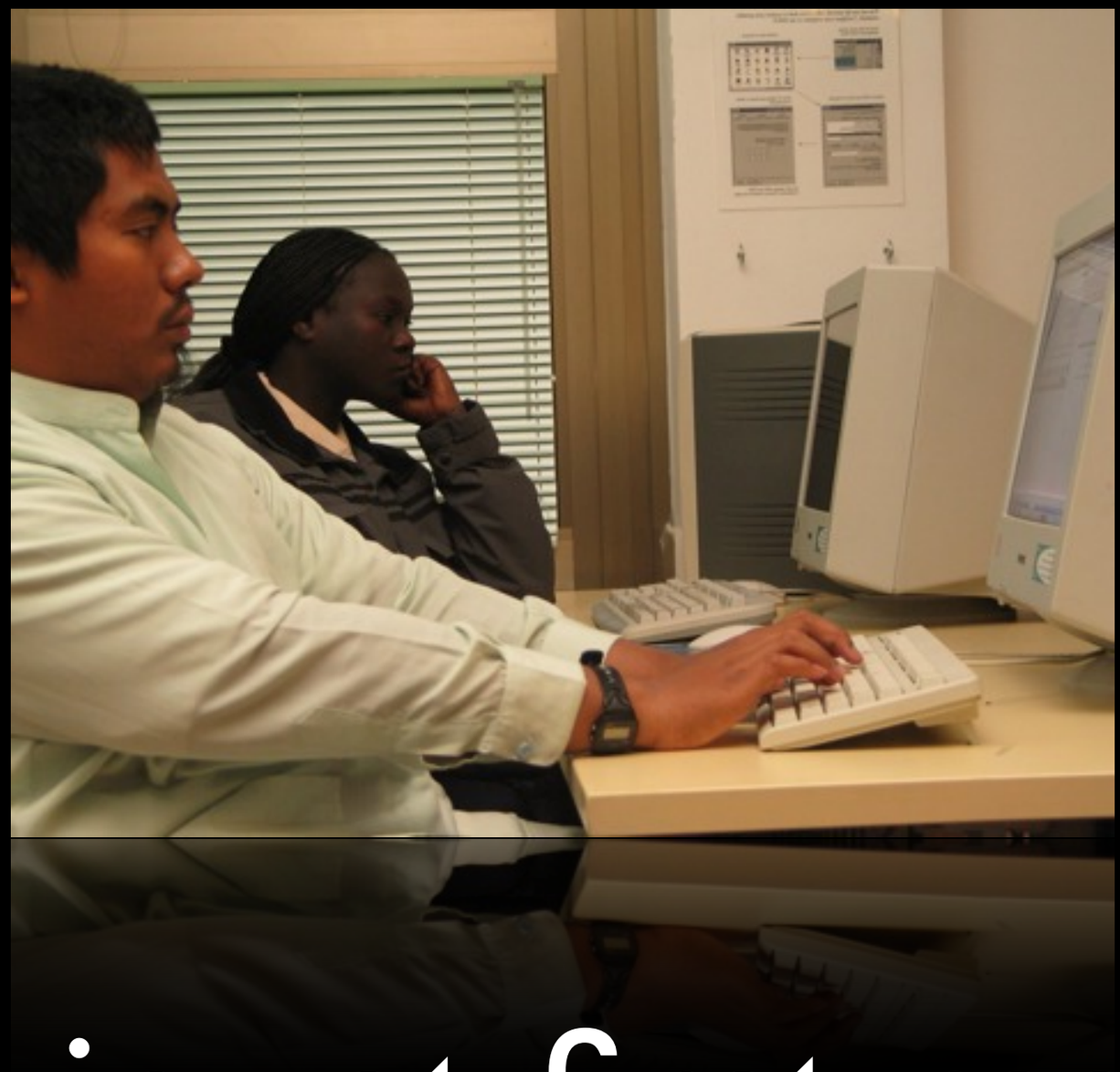
- International Centre for Theoretical Physics (ICTP)
- Science Diisemination Unit (SDU)
- Free Linux-based operating system: Ubuntu

Sponsors

Our sincere thanks go to

Magic Toolbox

for providing the



looking at first results

www.ictp.tv

science on the Internet

Home | ICTP Diploma | Conferences | Seminars | Special Events | About

Basic Physics

new one-year Diploma Programme

View the courses

High Energy Physics

one full year, pre-PhD level

View the courses

Condensed Matter Physics

one full year, pre-PhD level

View the courses

Mathematics

one full year, pre-PhD level

View the courses

Earth System Physics

one full year, pre-PhD level

View the courses

From September 2007, all lectures given within the ICTP Diploma Programme are being automatically recorded using the new EyA technology developed by the ICTP Science Dissemination Unit. The access to this digital material is made here available to the public.

This project aims to enhance ICTP's mandate of transferring knowledge to scientists from developing countries. It is our hope that these public recordings will be useful for students as well as lecturers beginning their teaching careers in science.

For more information about the courses, including the schedule of lessons, please visit the website of the Diploma Programme.

Disclaimer: ICTP publishes these lectures on the web and distributes them in digital form only for educational purposes. It will not endorse or sponsor any commercial product, service or activity, and does not permit the recorded material to be used for commercial purposes.

ICTP .TV

www.ictp.tv

science on the Internet: education and dissemination

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Technical requirements

Q.: what is needed to see ictp.tv?

the free Apple QuickTime plugin is required
(available for PC and Mac) or the Adobe Flash Player (for Linux).

we recommend MS Internet Explorer, Safari or Mozilla/Firefox Browsers.

What kind of

More than just

ictp.tv is based on a
developed at ICTP: it
audio/video recordin
high-definition pictures (refreshed
seconds), allowing you to zoom o
detail and making you feel one of
audience.

Q.: Can't you improve this?

A better ictp.tv to satisfy your needs.

nhance our EyA software
eat features:
faster view, no more to
download);
ddition to QuickTime;
rsion, to enjoy ictp.tv on
layer.

Bandwidth requirements

Q.: does ictp.tv require a fast network?

Faster network connections, like DSL or similar, allow faster download of ictp.tv recordings.
As an example, it will takes ~7 minutes to download one hour of recordings using an ADSL connection and ~7 hours using a 56Kbps modem.

www.ictp.tv

science on the Internet

About EyA

EyA ("Enhance your Audience") is an innovative automated audio/video/slide recording system, developed to archive and share scientific lectures and talks carried out using digital presentations (PPT, PDF, animations, etc) and specially traditional chalkboards found in classrooms.

The EyA system has these main features:
- no human intervention during recording and post-processing;
- scalable architecture;
- no special requirements for the speaker or lecturer;
- high resolution of images;
- low total cost of ownership and implementation;
- low-bandwidth friendly features (zip, CD, DVD).

More info.

GET openEyA

openEyA is the Linux-based version of the EyA recording system

ICTP .TV

www.ictp.tv

science on the Internet: education and dissemination

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one full year, pre-PhD level
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Earth System Physics
one full year, pre-PhD level
View the courses

There are **4195** recorded hours of Physics and Mathematics Lectures available on-line!

Lectures given within the ICTP Diploma Programme are being automatically recorded (see Academic Years: 2007/2008, 2008/2009, current), using the EyA technology developed by the ICTP Science Dissemination Unit. The access to this digital material is made here available to the public. See the ICTP Diploma Awards Ceremony 2009.

This project aims to enhance ICTP's mandate of transferring knowledge to scientists from developing countries. It is our hope that these public recordings will be useful for students as well as lecturers beginning their teaching careers in science.

For more information about the courses, including the schedule of lessons, please visit the website of the Diploma Programme.





v1.1

Diploma on www.ictp.tv

Visit **ICTP-SDU** for **info**

select diploma course

- « **Basic Physics** (BP)
- « **High Energy Physics** (HEP)
- « **Mathematics** (MTH)
- « **Condensed Matter Physics** (CMP)
- « **Earth Systems Physics** (ESP)

archives

- « last year (password required)
- « other recordings

resources

- « www.ictp.tv
- « Main ICTP Website
- « About EyA

DIPLOMA COURSE IN BASIC PHYSICS

Disclaimer: ICTP publishes these lectures on the web and distribute them in digital form only for educational purposes. It will not endorse or sponsor any commercial product, service or activity, and does not permit the recorded material to be used for commercial purposes.

For more information about the courses, including the schedule of lessons, please visit the website of the Diploma Programme.

AVAILABLE TOPICS – ACADEMIC YEAR 2007/2008

Mathematical Methods
(recorded hours: 98)

Classical Mechanics
(recorded hours: 40)

Quantum Mechanics
(recorded hours: 62)

Advanced Electromagnetism
(recorded hours: 2)

(4 topics found, for a total of 202 hours)

v1.1

Diploma on www.ictp.tv

Go back to the **Main Page**

select diploma course

« **Basic Physics** (BP)

« **High Energy Physics** (HEP)

« **Mathematics** (MTH)

« **Condensed Matter Physics** (CMP)

« **Earth Systems Physics** (ESP)

archives

« **last year** (password required)

« **other recordings**

resources

« www.ictp.tv

« Main ICTP Website

« About EyA

DIPLOMA COURSE IN BASIC PHYSICS (BP)

LECTURES ON QUANTUM MECHANICS

*A total of **62 hours** was found for this topic.*

Complete list, in reverse chronological order (invert):

HOUR 61&62 (2008.01.07)

Lecturer: G. Thompson (ICTP)

Hour 61: 14.00—14.59 (room "H")

Download: zipfile (QT format, 224.0MB)
or View now: QuickTime, Flash.

Hour 62: 15.00—15.59 (room "H")

Download: zipfile (QT format, 190.2MB)
or View now: QuickTime, Flash.

HOUR 59&60 (2007.12.18)

Lecturer: L. Velasco-Sevilla (ICTP)

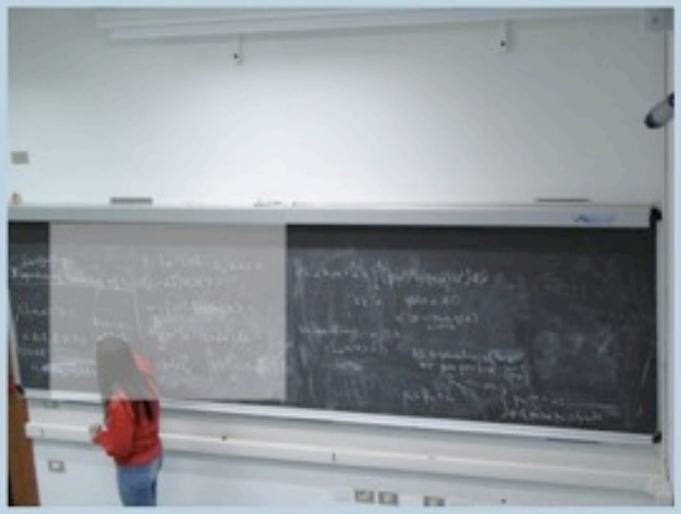
Hour 59: 11.00—11.59 (room "H")

Download: zipfile (QT format, 169.4MB)
or View now: QuickTime.

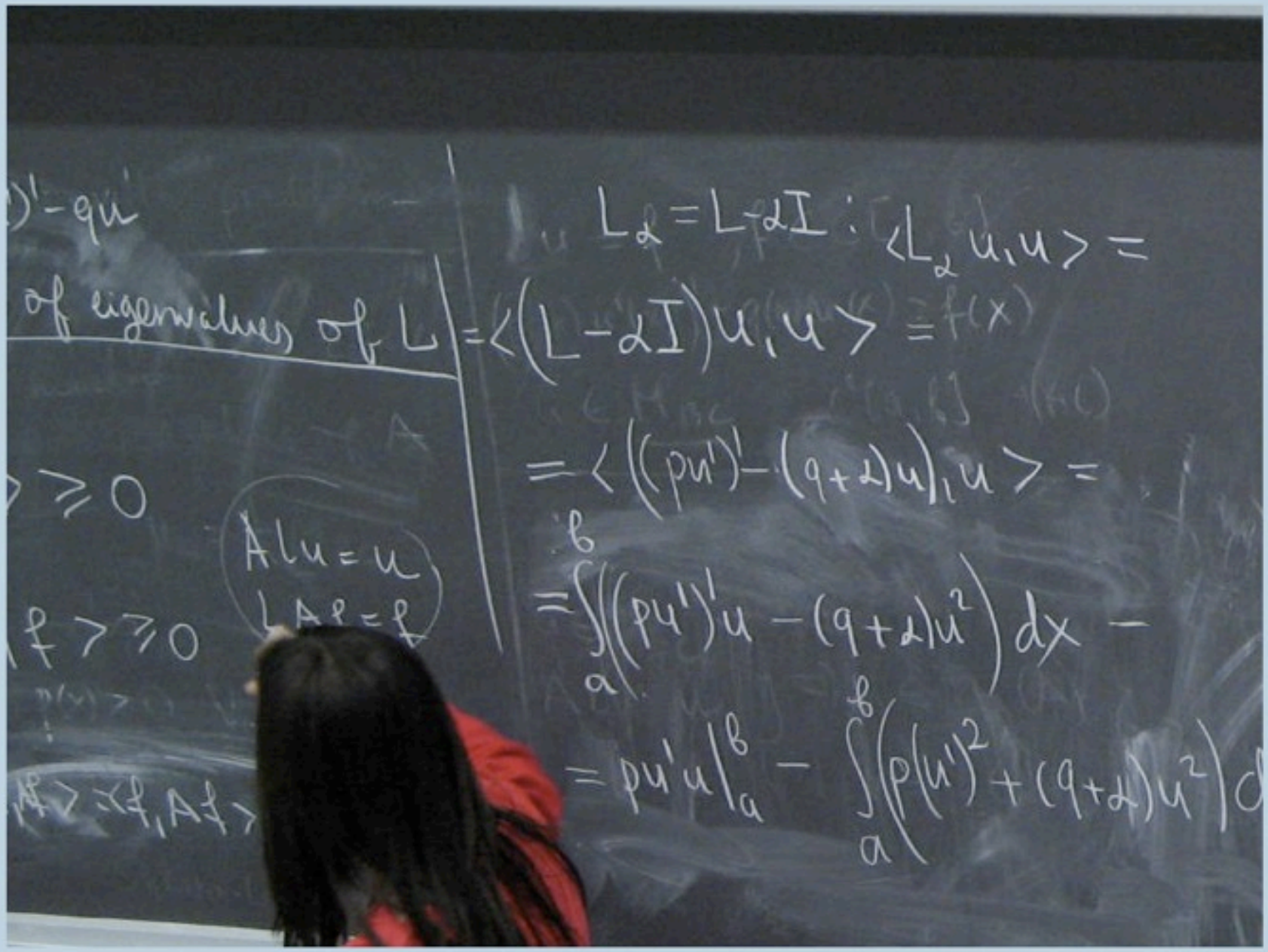
Notes: tutorial

Audio/video recording with synchronized slides

Date: 2007/03/08 10:00-10:59



Open the **original image** in a new window.

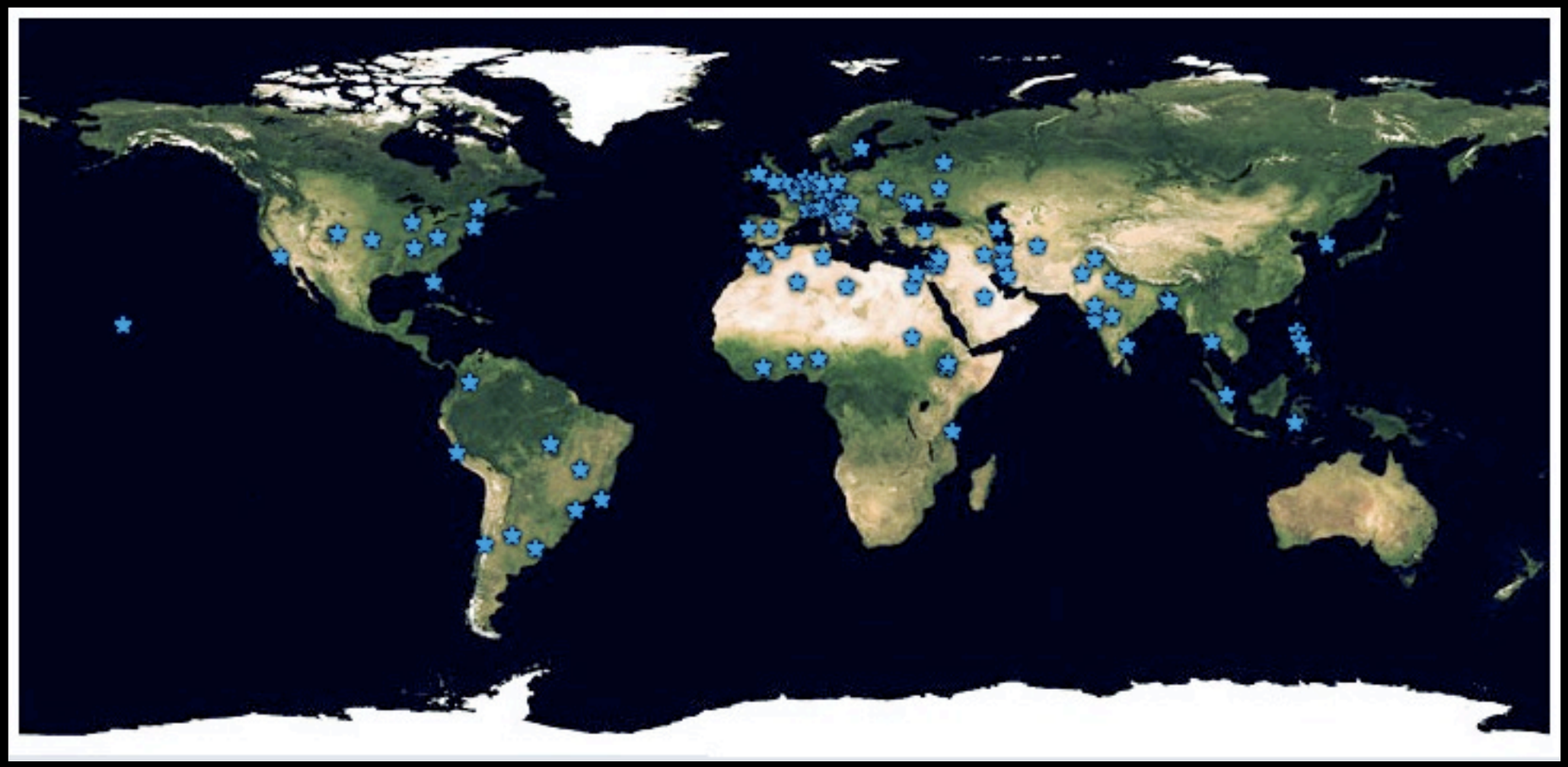


statistics: EyA 2007

ICTP Diploma Programme (3 sep '07 - 10 jan '08)

- number of rooms with (redundant) recording capability: 3
- fields of teaching: 5 (BP, HEP, CMP, ESP, MTH - pre-PhD)
- number of recorded courses: 25
- total recorded hours: 1100
- missing hours (for technical probems): 4
- number of local students (from Developing Countries): 52
- number of computer used: 8 (Mac, total cost: <5000 euro)

2007: www.ictp.tv

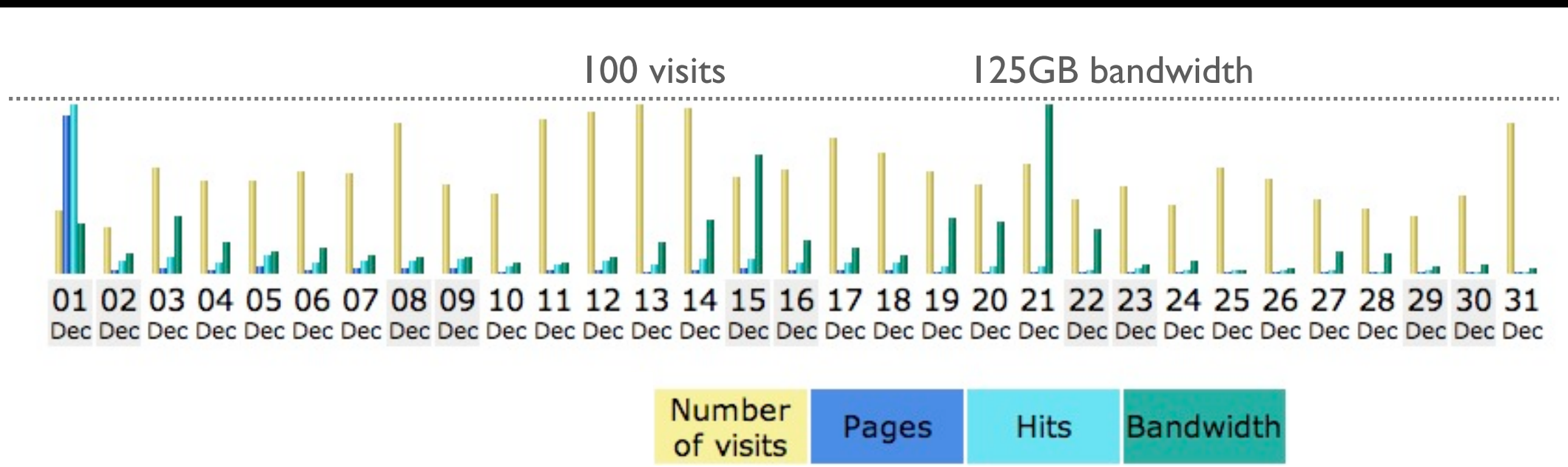


(location of top 50 downloaders of recordings)

statistics 2007

recording seen from the web (dec 2007)

- 708,83 GBytes (~3540 hours) in 1 month
- unique visits (excluding locals): 1600 in 1 month



2009: www.ictp.tv

distance in which individuals are clustered
Dot sizes: = 1,000+ = 100 - 999 = 10 - 99 = 1 - 9 visits

15 May 2009 to 15 Oct 2009: 4,685 visits shown above

Current Country Totals
From 15 May 2009 to 15 Oct 2009

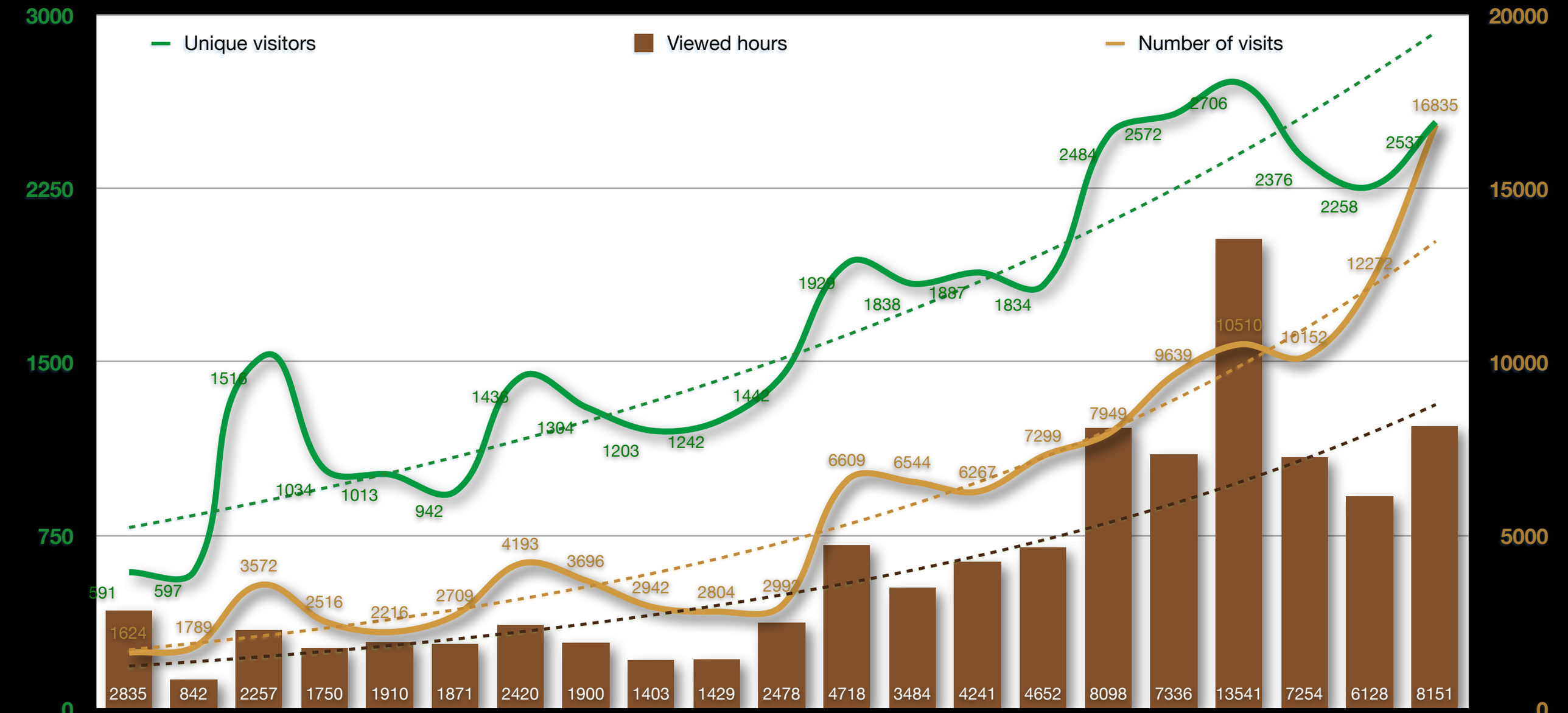
Italy (IT)	992
India (IN)	483
China (CN)	473
United States (US)	405
Mexico (MX)	256
Brazil (BR)	248
Iran, Islamic Republic of (IR)	102
Pakistan (PK)	97
Uruguay (UY)	95
Canada (CA)	82
Colombia (CO)	75
United Kingdom (GB)	69
Egypt (EG)	68
Germany (DE)	61
Algeria (DZ)	61
Sudan (SD)	52
Turkey (TR)	49
France (FR)	43
Serbia (RS)	42
Saudi Arabia (SA)	40
Indonesia (ID)	40
Bangladesh (BD)	40
Ethiopia (ET)	32
Argentina (AR)	31
Russian Federation (RU)	27
Belgium (BE)	26
Nigeria (NG)	25
Philippines (PH)	25
Austria (AT)	25
Sweden (SE)	24
Sri Lanka (LK)	21
Thailand (TH)	20
South Africa (ZA)	20

last 5 months!

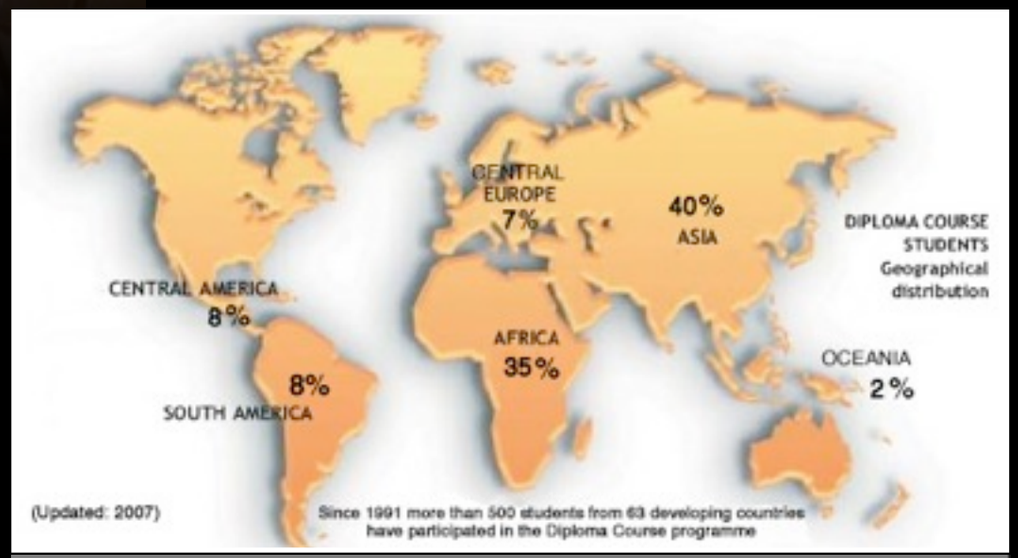
Still many countries under-represented, largely because of scarce bandwidth

statistics 2009

Monthly statistics for the website ICTP.TV (period: Dec 2007 - Aug 2009)



Opening Ceremony,
2007/2008 ICTP Diploma Programme



feedback from students

benchmarking: questionnaire proposed to 52 students at the end of 1st semester (3 sep - 21 dec 2007)

- time spent reviewing recordings: ~10 hours/week
- 20% of students advertise the on-line recordings to colleagues in their countries
- half students have followed on-line recordings of courses belonging to other fields
- availability of on-line recordings changed the learning methods for 97% of students

comments from students

students told that on-line recordings have been useful:

- *"to review/revise missing points and concepts"*
- *"to clarify handwritten notes"*
- *"to recover missed classes"*
- *"to understand concepts when lecturers go too fast"*
- *"to prepare for exams"*
- *"to adapt with the english environment"*
- *"to avoid writing notes and concentrate on the blackboard"*
- *"to mark it for possible long-term research"*

other tests of EyA

- Latin America and Caribbean (EsLaRed, mobile unit)
- Netherlands, Brazil, MIT (!!!), many more...
- University of Parma (EyA and OpenEyA)
- Trento (UNITN, software development, research)
- Trieste: SISSA, FEST 2007, G8-UNESCO meeting
- other workshops and conferences at ICTP

publications

- *presentations and proceedings at international conferences*
- poster selected for WWDC07: Apple Developers Conference, USA, june 2007
- article on EURODL European Journal of Open and Distance Learning: "*Webcasting of Traditional Chalkboard Lectures: The EyA System*", september 2007
- article on DE QUALITATE: Rivista Italiana della Qualità: "*Come Registrare Automaticamente e Pubblicare in Internet Conferenze e Lezioni e Raggiungere un Milione di Scienziati*", november 2007
- article on Physics World: *"The Video Revolution Made Simple"*, december 2007

Now, what's next?

- recording of ALL workshops and conferences at ICTP (>50 activities/year)
- spreading the idea of automated low-cost recording and publishing (specially in DC!)
- TAGGING !!! (SEO is key to success)
- how to alleviate bandwidth issues
- new technologies, HTML5 and video, interaction, annotations, communities...

Thank you for your patience!

Questions?

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