EU-HOU MW-project
Connecting classrooms to the Milky Way

COMENIUS - EU commission "LifeLong Learning Program" (2010-2012) coordinated by University Pierre et Marie Curie

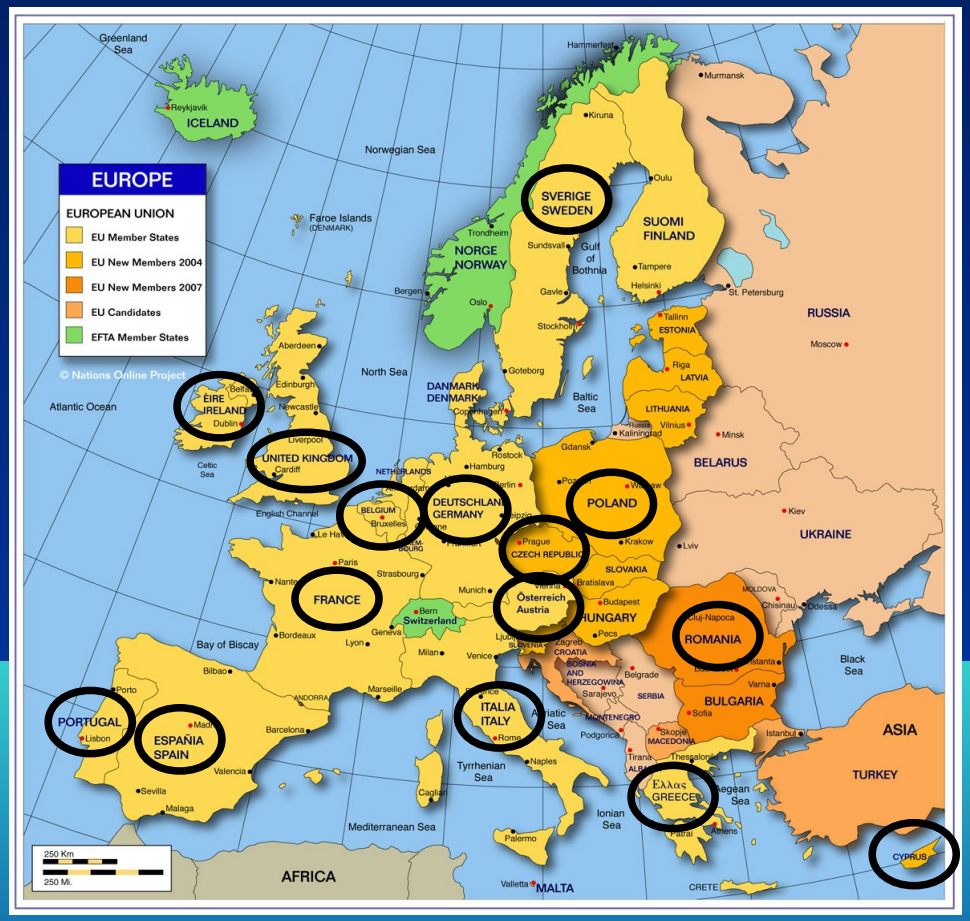
Outreach within Radionet Workshop

Nov 17th-19th, Bologna

Philippe SALOME
LERMA, Obs de Paris
FRANCE

EU-Hands on Universe

European Consortium



European Commission
Education & Learning

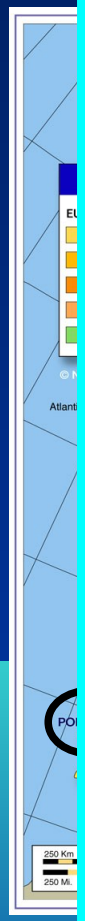
- Minerva Program (8)
2004 – 2006 : 370 k.euros

- Comenius Program (14)
2008 – 2010 : 300 k.euros

- Comenius program (11)
'LifeLong Learning Program'
Radio-astronomy
2010 – 2012 : 300 k.euros

EU-Hands on Universe

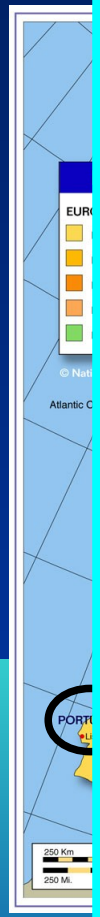
European Consortium



Université Pierre et Marie Curie (France) - *F-HOU Coordinator*
Karl-Franzens-Universität Graz (Austria)
Observatoire royal de Belgique
Lykeio Agiou Nikolaou (Cyprus)
Astronomicky ustav Akademie (Ceske Republiky)
National Observatory of Athens (Greece)
Cork Institute of Technology (Ireland)
Fondazione IDIS – Citta Della Scienza (Italy)
Nicolaus Copernicus university (Poland)
Nucleo Interactivo de Astronomia (Portugal)
Universitatea din Craiova (Romania)
Universidad Complutense de Madrid (Spain)
House of Science (Sweden)
Cardiff University (United Kingdom)
F.A.S. Bonn (Germany)

EU-Hands on Universe

European Consortium



<u>HOU is the leading team of</u>

« Galileo Teacher Training Program »

a cornerstone launched by IAU and UNESCO for IYA 2009
Now included in the IAU decadal strategic plan
for astronomy development

3rd price AMA09/Mani Bhaumik for "*Excellence in Astronomy Education and Public Outreach*"

Silver award of the European Commission at the occasion of the conference « Innovation and Creativity in the Lifelong Learning Programme: Create, Innovate and Cooperate » held in Prague, 6-7 May 2009

Goals

- Raise the **attractiveness** of science education
- Participate to the development and **modernisation of EU schools**
- Promote scientific **methods/knowledge**

How ?

- Production of innovative **pedagogical resources** and exercises based on real astronomical data available from a **multilanguage website**

- Production of a pupil-friendly **software**: *SalsaJ*

- Creation of a network of researchers and teachers and dissemination through workshops and **teacher training** sessions

- Pedagogical use of worldwide **telescope networks operated remotely**

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http://www.euhou.net/

EU-HOU

Bringing frontline interactive astronomy to the classroom

Forum

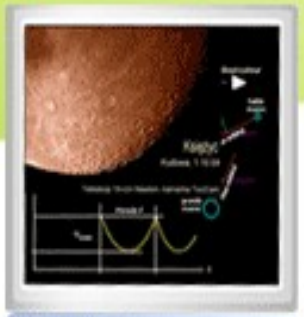
Important dates

Tools

News

- Supernova in M100 !!!
- The Life of Stars and their Spectra
- Measuring Distances to Cepheids.
- Annular Eclipse in Bragança (Portugal), 3 October, 2005

What is EU-HOU ?



Exercises

Software

Contact

RSS 2.0

Radio Astronomy Posters

- Pedagogical document for teachers (11 pages)

- Can be used in classrooms (quizz)

http://www.fr.euhou.net/index.php?option=com_content&task=view&id=134&Itemid=156

Cardiff – 22-25 August 2009

OHP – 7-10 May 2009

Hundreds of European teachers trained. **Thousands** of European pupils have used HOU tools

Torun – 5-8 May 2010

Remote access to Optical telescope

Remote access to Radio telescope

Jodrell Bank Internet Observatory (JBiO) - Mozilla Firefox

Fichier Édition Affichage Historique Marque-pages Outils Aide

http://webmail.jb.man.ac.uk/distance/observatory/index.php

Seminaires Programming Observatory Concours Science PdB ALMA Utilities e-mails Gmail Mandriva

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Jodrell Bank Internet Observatory (JBiO)

Front Page | Jodrell Bank Observatory | University of Manchester | 9:38:00 Wed 10 Nov 2010

Logged Out

Documents

- Introduction
- Manual
- Exercises

Tools

- Login
- Logout
- Observe
- Schedule
- Archive
- Monitor
- SkyMap
- Source Track
- WebCam
- Other Tools

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Jodrell Bank Internet Observatory (JBiO)

Telescope Status: Control: Remote Motors: On Observation: Not Tracking Azimuth: 44.7 Elevation: 58.0

The Jodrell Bank Internet Observatory (JBiO) is a remotely-controlled 7-metre radio telescope used by full-time Undergraduate students of the University of Manchester, and for schools projects run by Jodrell Bank Observatory.

The data archive is freely available but access to the telescope control system requires Login using a username and password.

A general description of the JBiO telescope can be found by clicking on the Introduction link under the **Documents** side menu.

The above **Telescope Status** bar indicates whether the radio telescope is currently enabled for observing. The Monitor link under the **Tools** side menu shows the current status in more detail. If the status bar and the Monitor screen do not show control as "Remote" and the telescope motors are "Off", the telescope is probably not available for observing due to severe weather (high winds or snow) or is undergoing maintenance (usually Mondays).

The JBiO telescope is operated by Jodrell Bank Observatory, part of the School of Physics & Astronomy of the University of Manchester.

- **Movie** Click here for a movie of the 7-metre telescope tracking a source whilst the Lovell Telescope conducts a HI survey and observes pulsars.

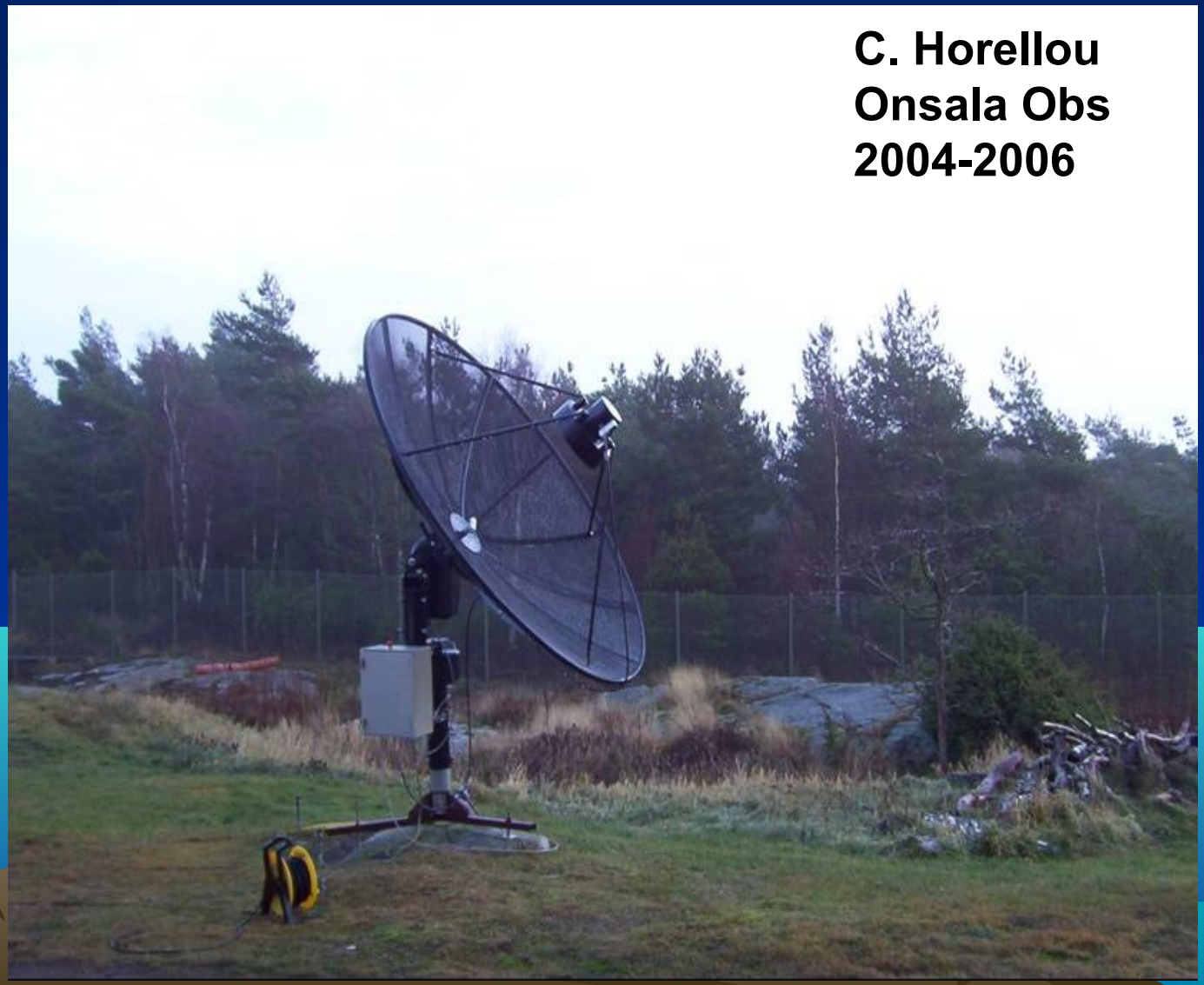
Tim O'Brien (web interface/control system, education), Christine Jordan (telescope control system), Alastair Gunn (web design/interface), Tim Ikin (receiver system), Stuart Lowe (SkyMap, photograph of 7m)

Jodrell Bank Observatory, School of Physics & Astronomy, The University of Manchester, Macclesfield, Cheshire SK11 9DL, United Kingdom

Tel: +44 (0) 1477 571321, Fax: +44 (0) 1477 571618

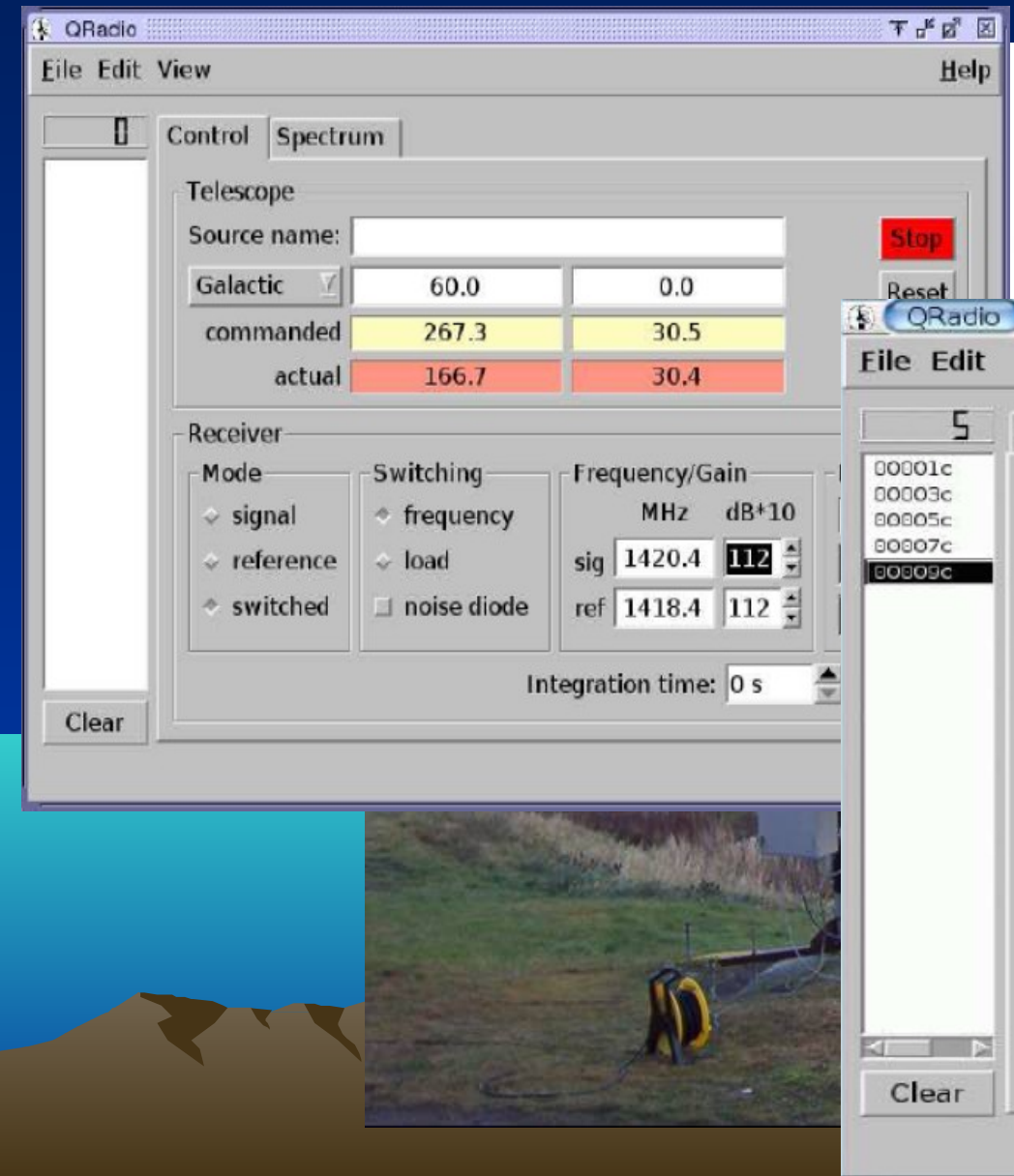
Terminé

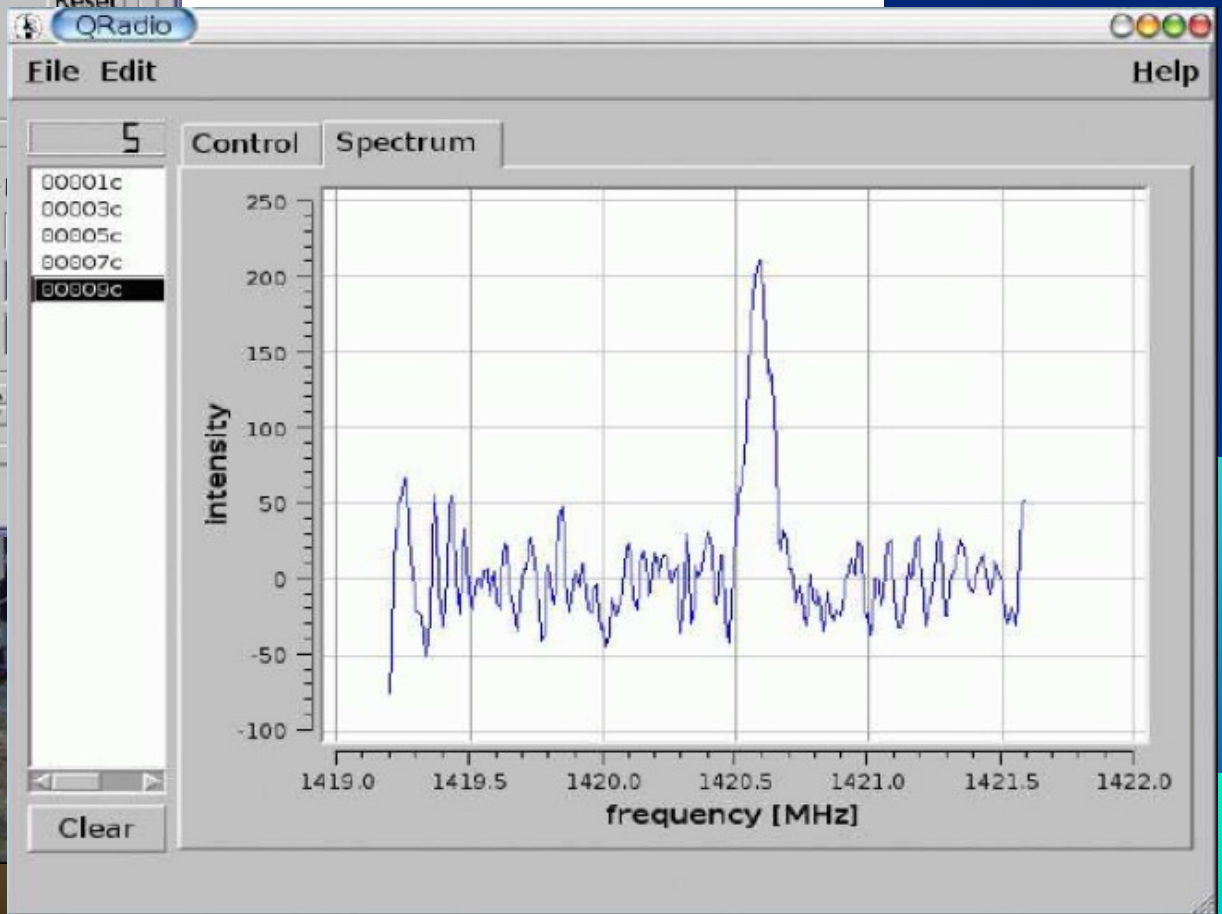
Remote access to Radio telescope Salsa – Onsala (Sweden)



Remote access to Radio telescope Salsa – Onsala (Sweden)

C. Horellou
Onsala Obs
2004-2006





The EU-HOU MW Project

Connecting Classrooms to the Milky Way

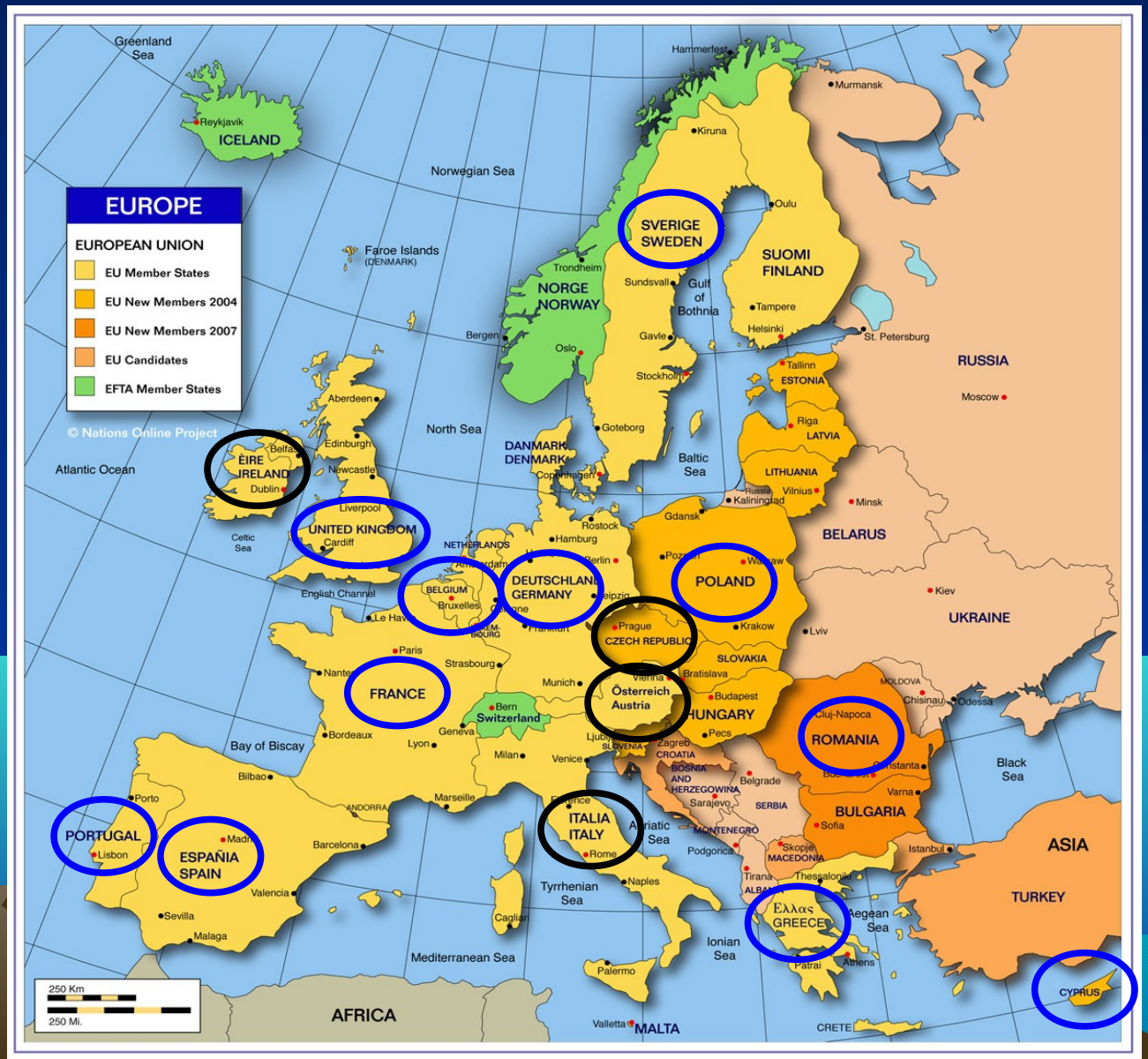
COMENIUS 2010-2012

- How: Develop the first European network of **radiotelescopes** for education, enabling European schools to explore the Milky Way through **Internet (via a browser)**

- Need: Coordinate the access to radio facilities and **improve the existing interfaces** (simplify the access and provide analysis tools) for use in schools with young people

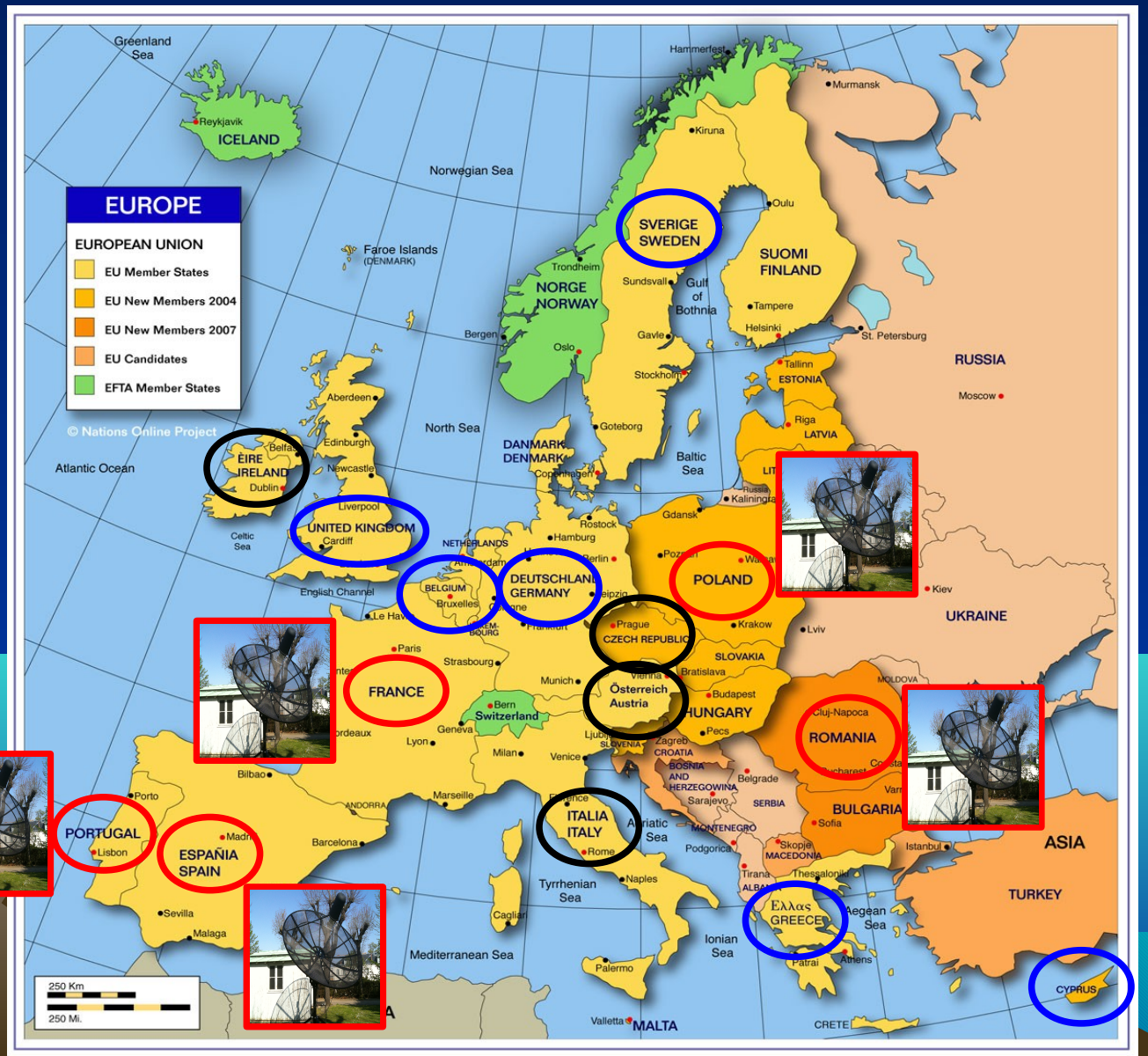
The EU-HOU MW Project

Comenius Project **11 European countries**



The EU-HOU MW Project

Radiotelescope Network **5 European countries**



The EU-HOU MW Project

Small Radio Antenna Prototype in Paris

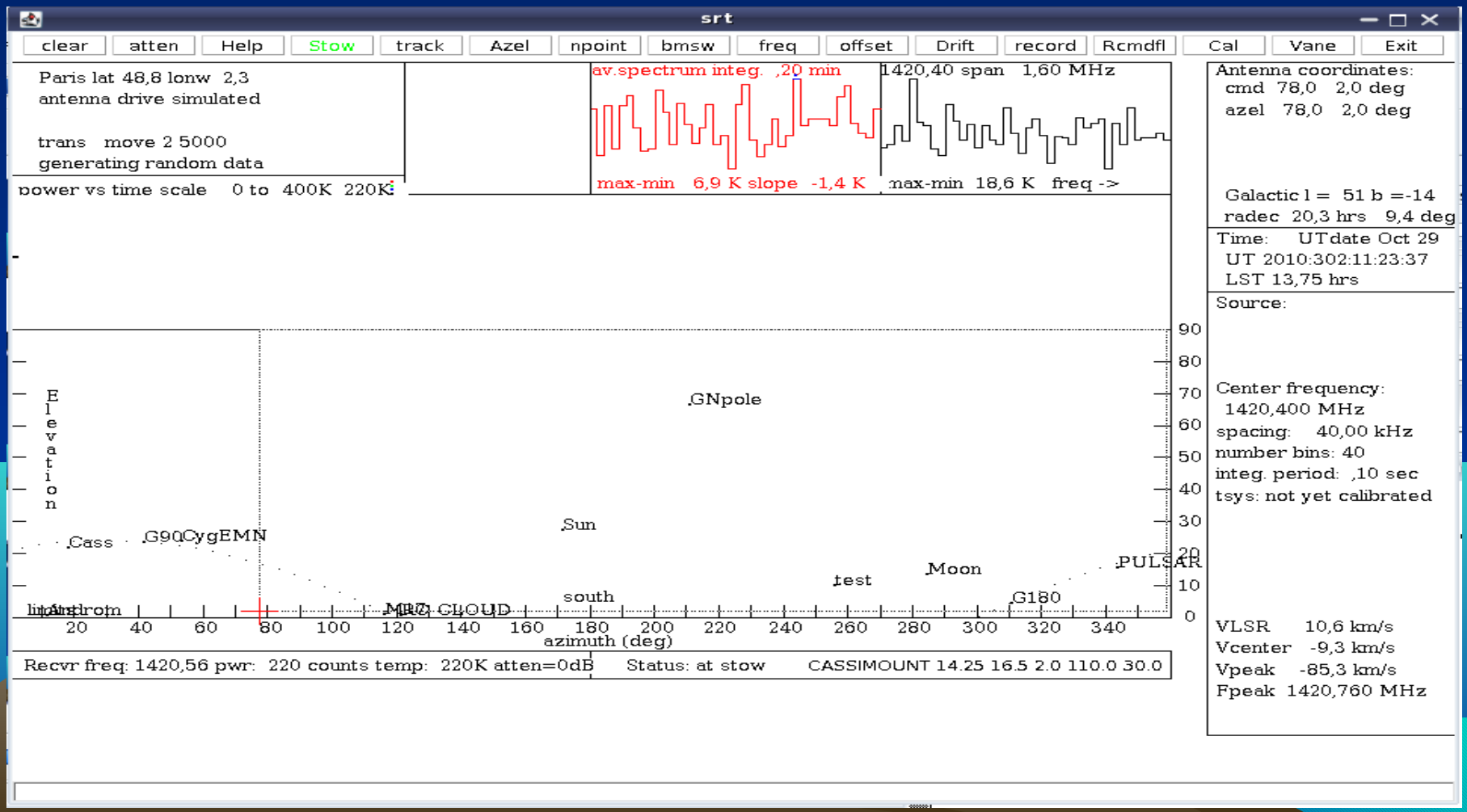
The EU-HOU MW Project

Radiotelescope Network **5 European countries**

- 5 radiotelescopes
- HI observation simulator from the LAB database (Kalberla)
- Pedagogical Interface to control the instruments/access the database from a classfoom **(for all pupils not only highly motivated groups)**
- Scheduling system to access the telescopes

Hardware/Software (MIT Haystack)

- 2.3m antenna equiped with a 1.4 GHz receiver
- Java-based software to control the antenna and the receiver – not user friendly / ascii output format



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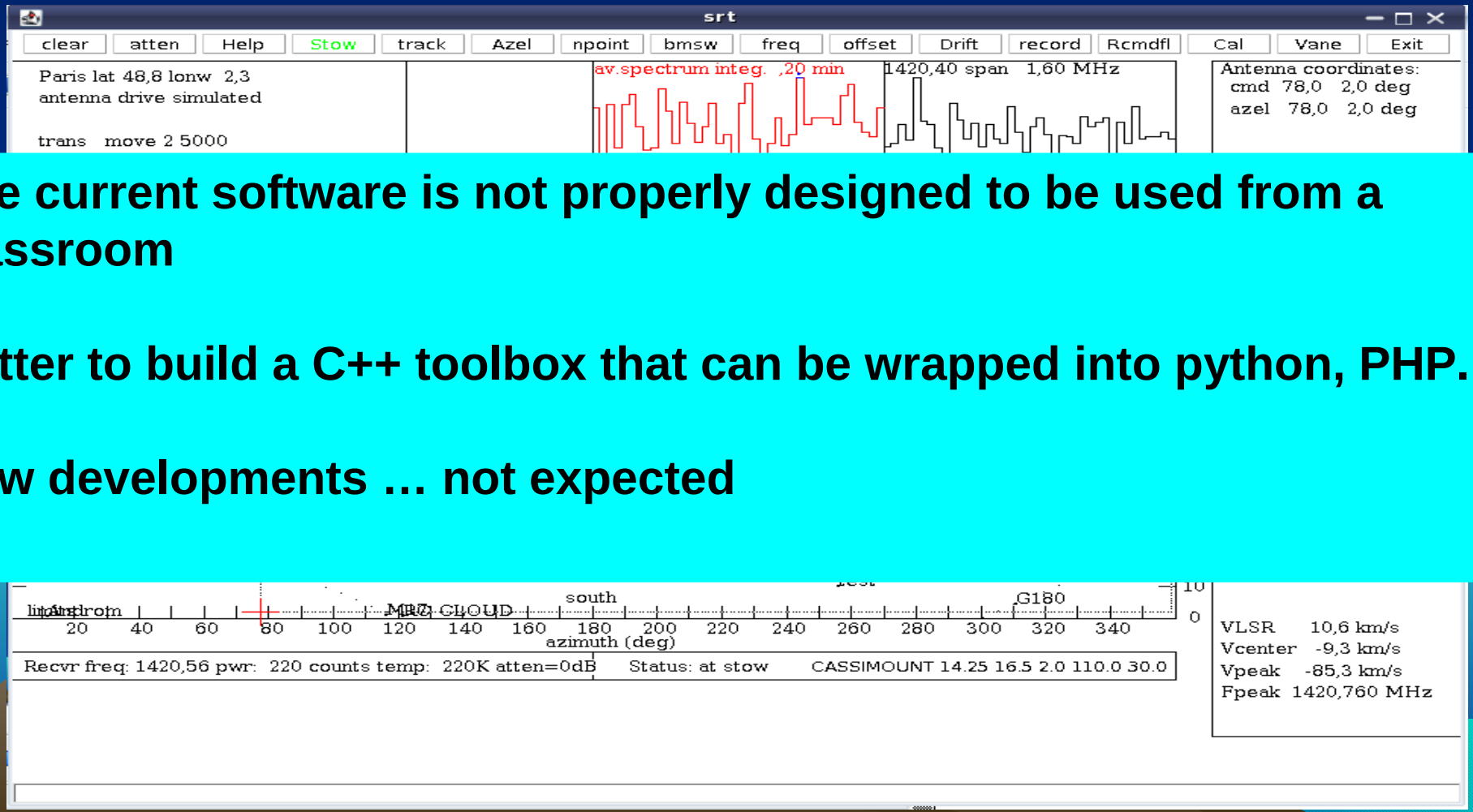


The current software is not properly designed to be used from a classroom

Better to build a C++ toolbox that can be wrapped into python, PHP...

New developments … not expected

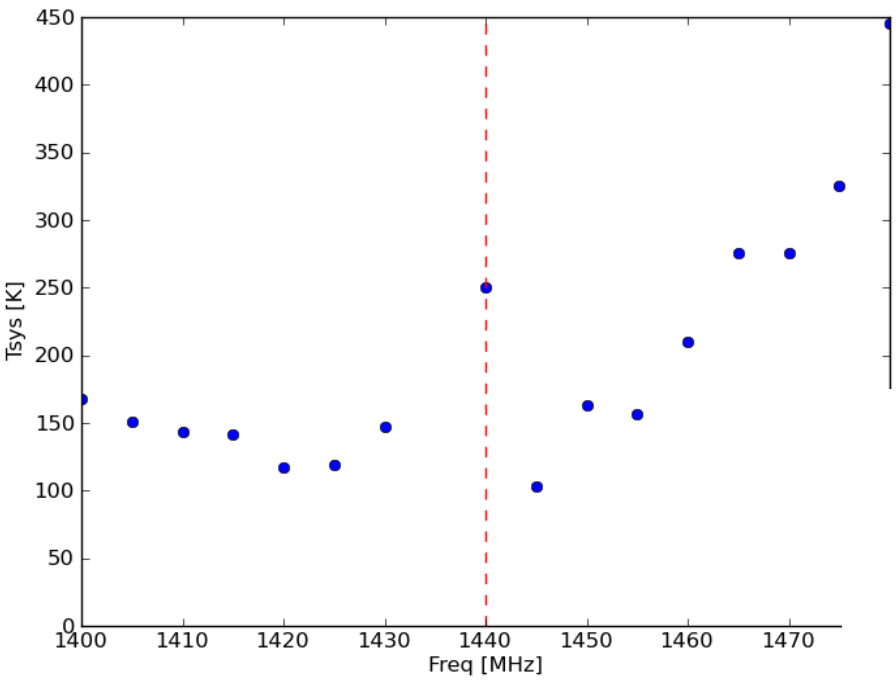
Study Cases beyond schools

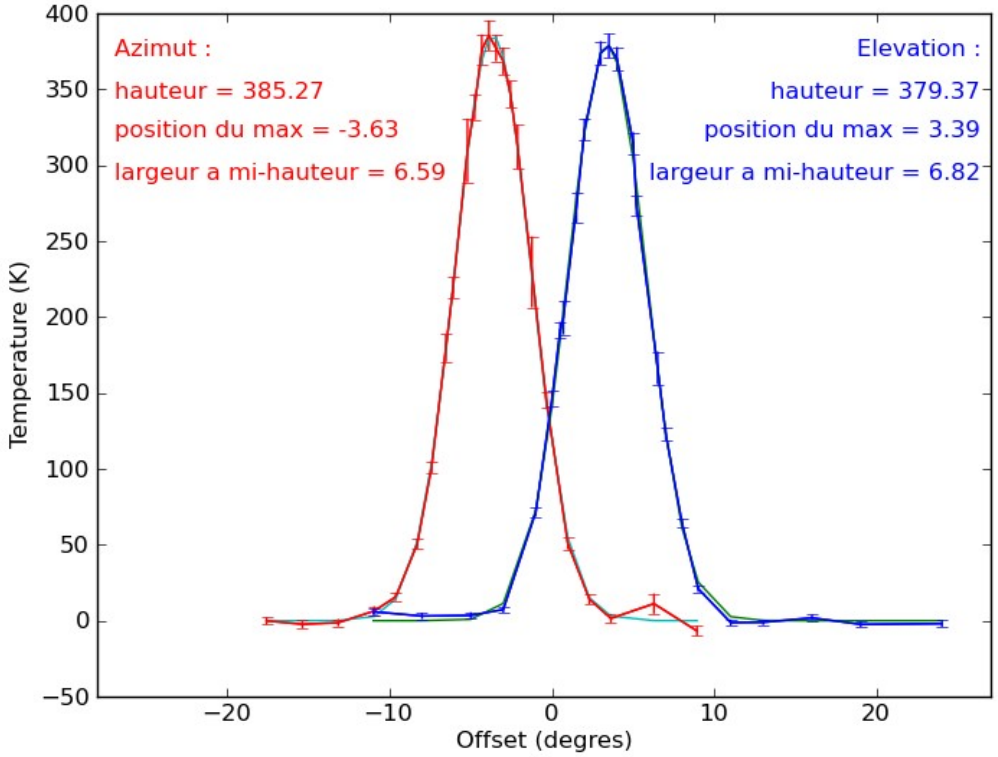
Students of the Paris University UPMC (one last summer, another this winter)

- Calibration with the warm load/noise cal
- Pointing on the sun (offset, beam size, efficiency)
- Obs of the galaxy

Very successful **Public Outreach** during the Open days of the Paris Observatory

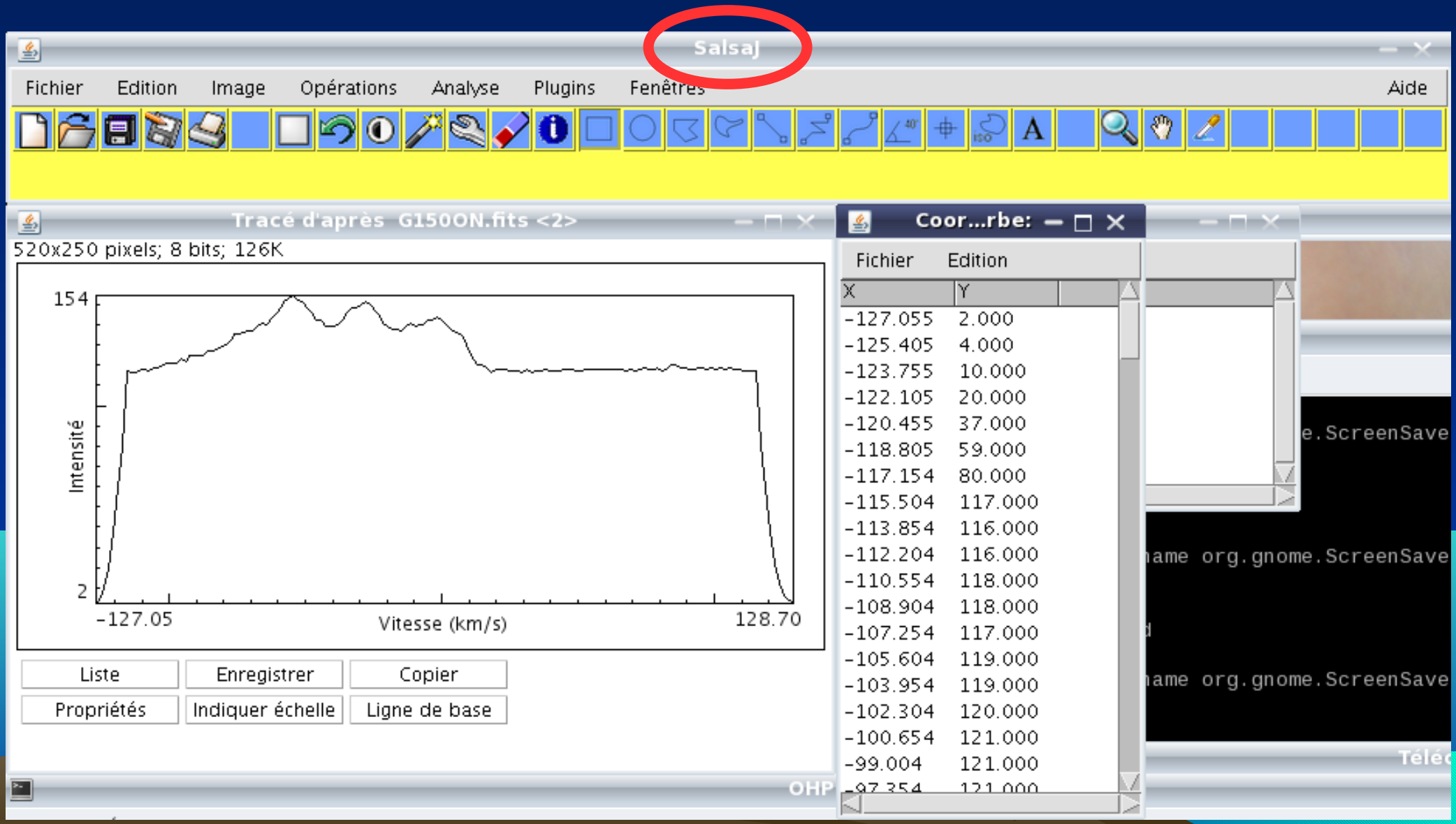
Observations





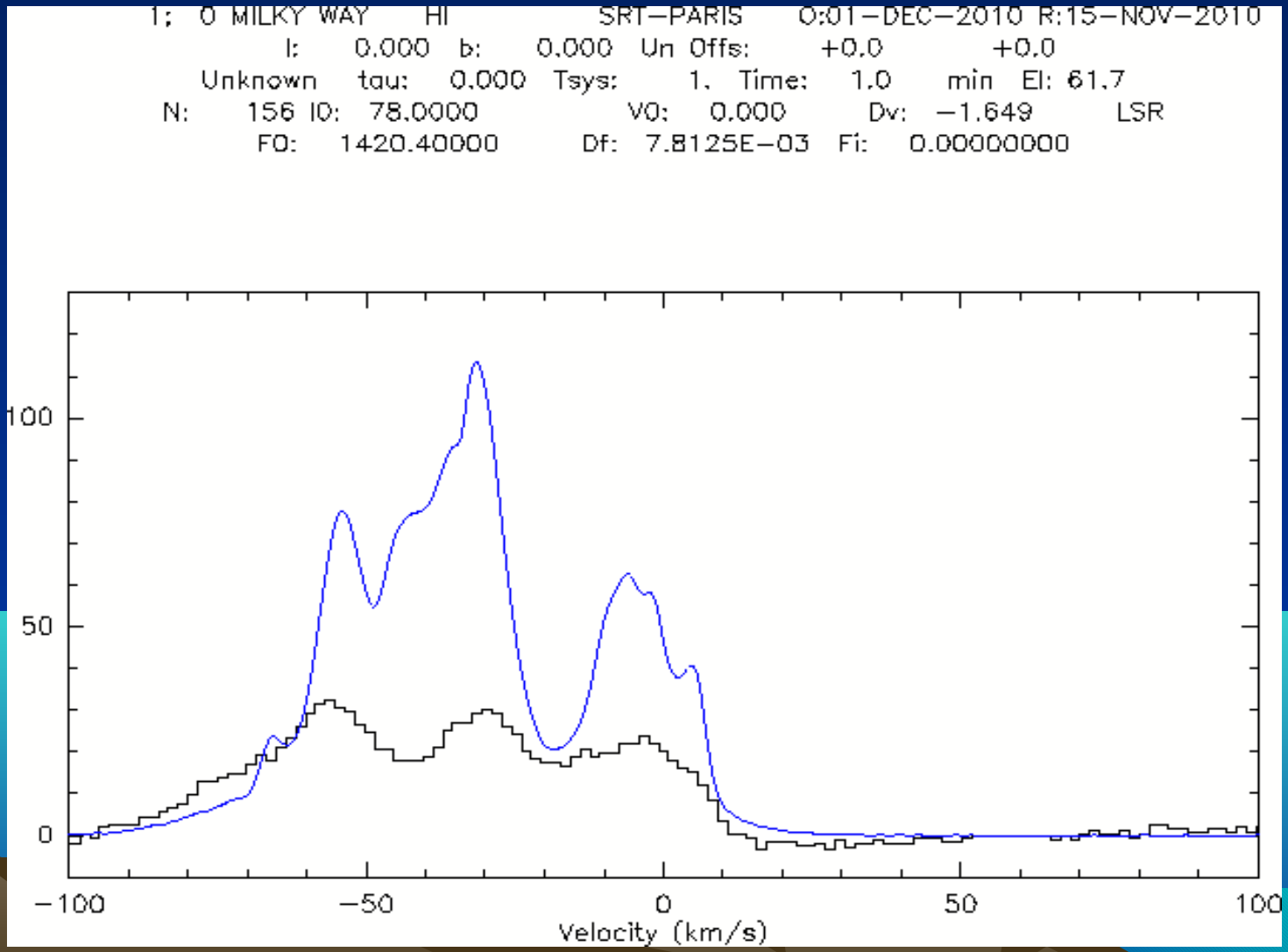
Analysis

- Fits conversion with pyfits : Read with **salsaJ**



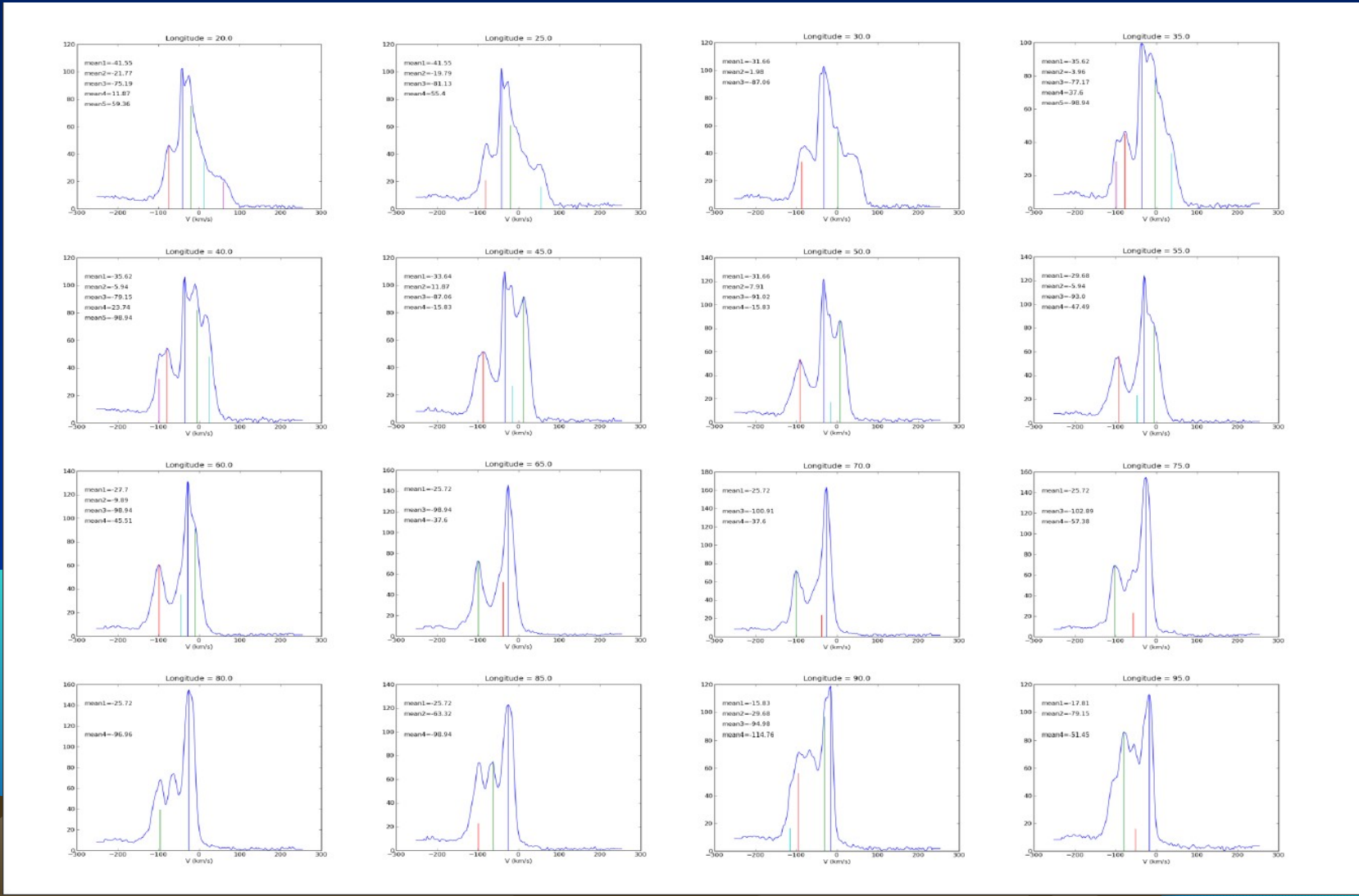
Analysis

- Fits conversion with pyfits : Read with **CLASS (GILDAS)**



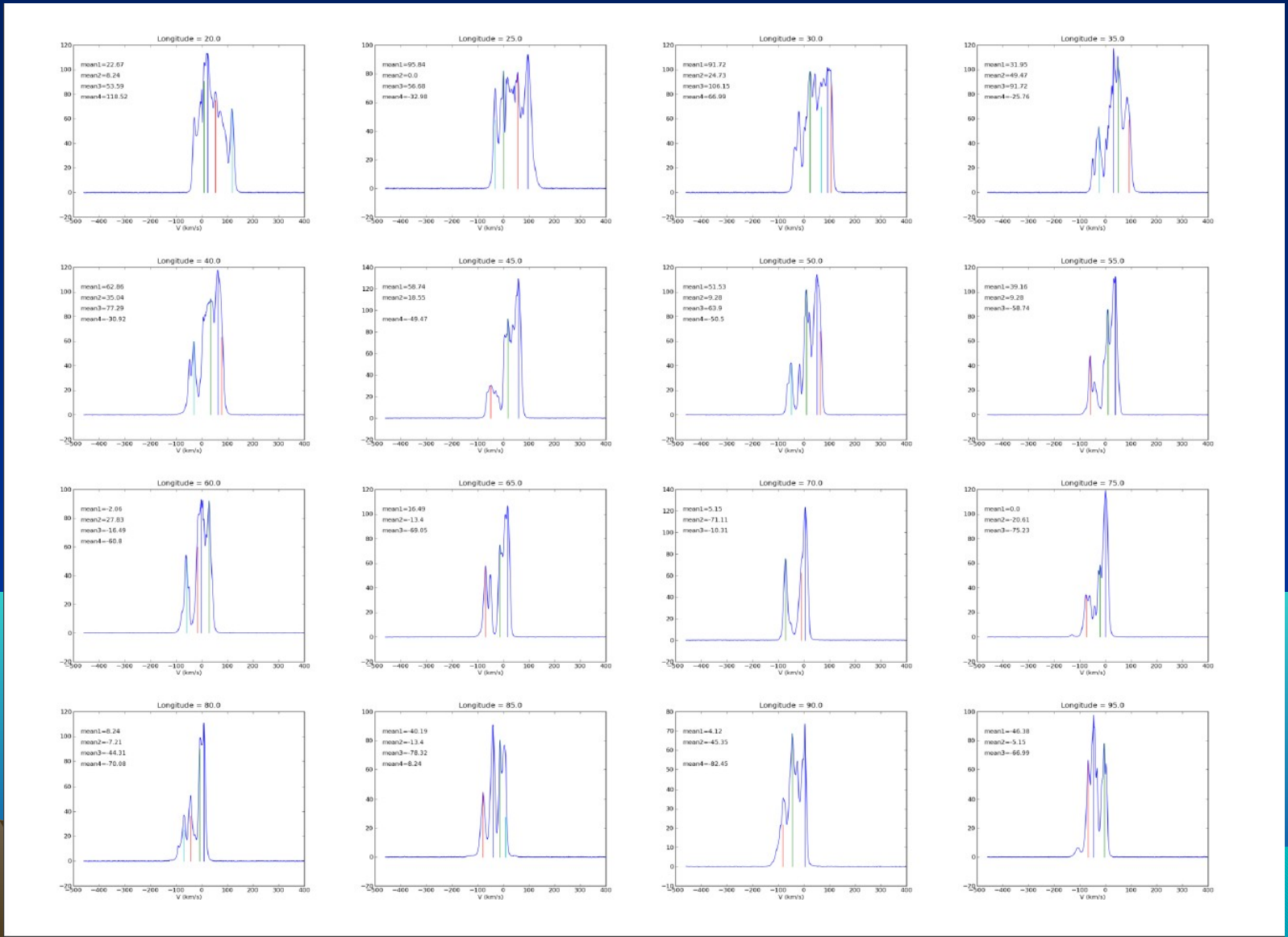
Analysis

- Line velocities automatic identification **(Onsala data)**



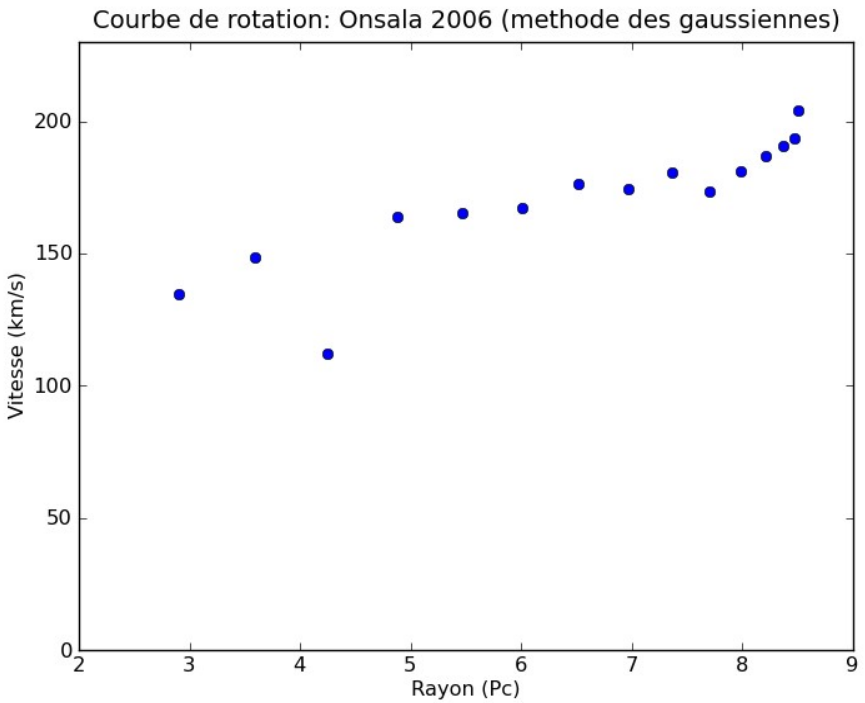
Analysis/Comparison

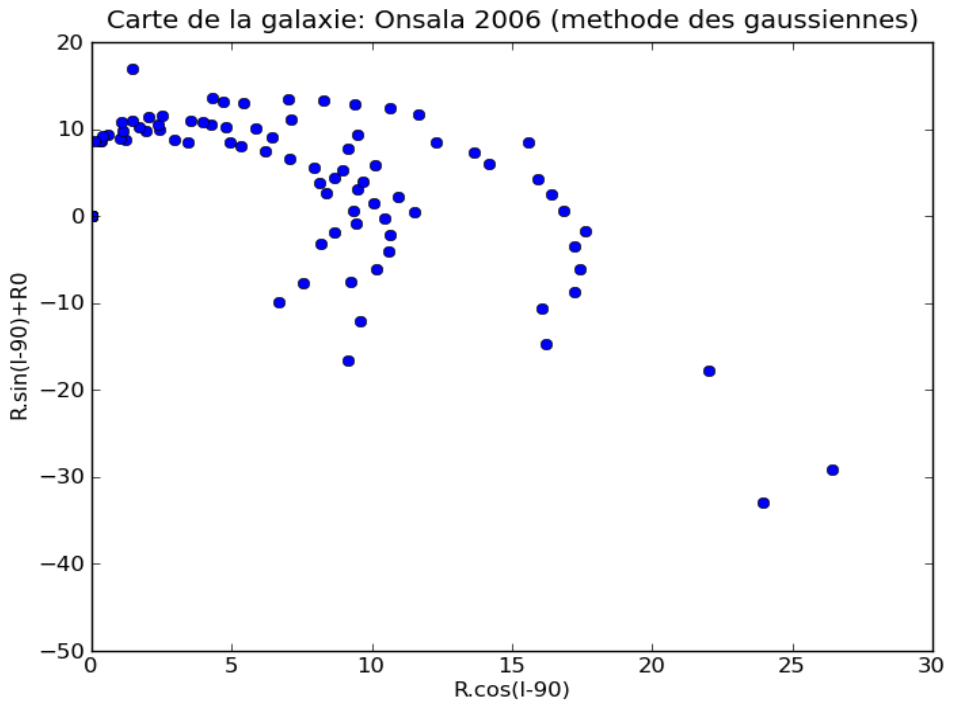
- Line velocities automatic identification **(LAB data)**



Analysis

- **Rotation curve and spiral arms** from the fitted data





Work in progress

• Python scripts to read and plot the data + conversion to fits format good to teach students but not enough for a use in secondary schools and for the public

Future Plans

• The actual software outdated : redesigned it to have an easy access from a web browser and provide post-processed analysed data – **Need Staff !! to build this new e-infrastructure** for science education

Possible long-term developments

- Build new backends (broader band, more channels)
- Build a new receiver
- Combine 2 antennas to build a small interferometer

*Large potential for education in **classrooms / university and general public outreach** – to explain radioastronomy*