

## **Report for the Short Visit Grant Interfaces between WG C2 Astrometry Reference Frame and WG C3 Quasars: improving GREAT activity/action**

*Turin-Italy, March 5-9, 2012*

### **Purpose of the visit**

To seed collaboration between WGC2 Astrometry Reference Frame and WGC3 Quasars GREAT working groups, the main aim to coadd scientific value in the exploitation of the Gaia potential. The applicants are co-facilitators of the two groups.

Gaia will survey with unprecedented accuracy approximately 500,000 QSOs, largely new detections. Besides the implications for QSO science, this sample will allow the best materialization ever of a reference frame, providing astrometry with the potential for testing General Relativity and probing modern Cosmology. These subjects were discussed at the GREATSF workshop "QSO Astrophysics, Fundamental physics, and Astrometric Cosmology in the Gaia era", last June. This meeting helped in starting/improving interexperiment and interdomain collaborations, and the planned visits are now to make the most of the generated momentum.

### **Description of the work carried out during the visit**

The GREATSF workshop was considered for publication in the *Memorie della Societa Astronomica Italiana*. The working week was devoted to assemble the contributions in order to finalize the volume of the proceedings and to envisage further steps that put in action the emerging ideas and the received feedback. Since most of the editors are working in Italy (Alexandre Andrei, Mario Lattanzi and Mariateresa Crosta), Sonia Anton was hosted in OATo, Turin.

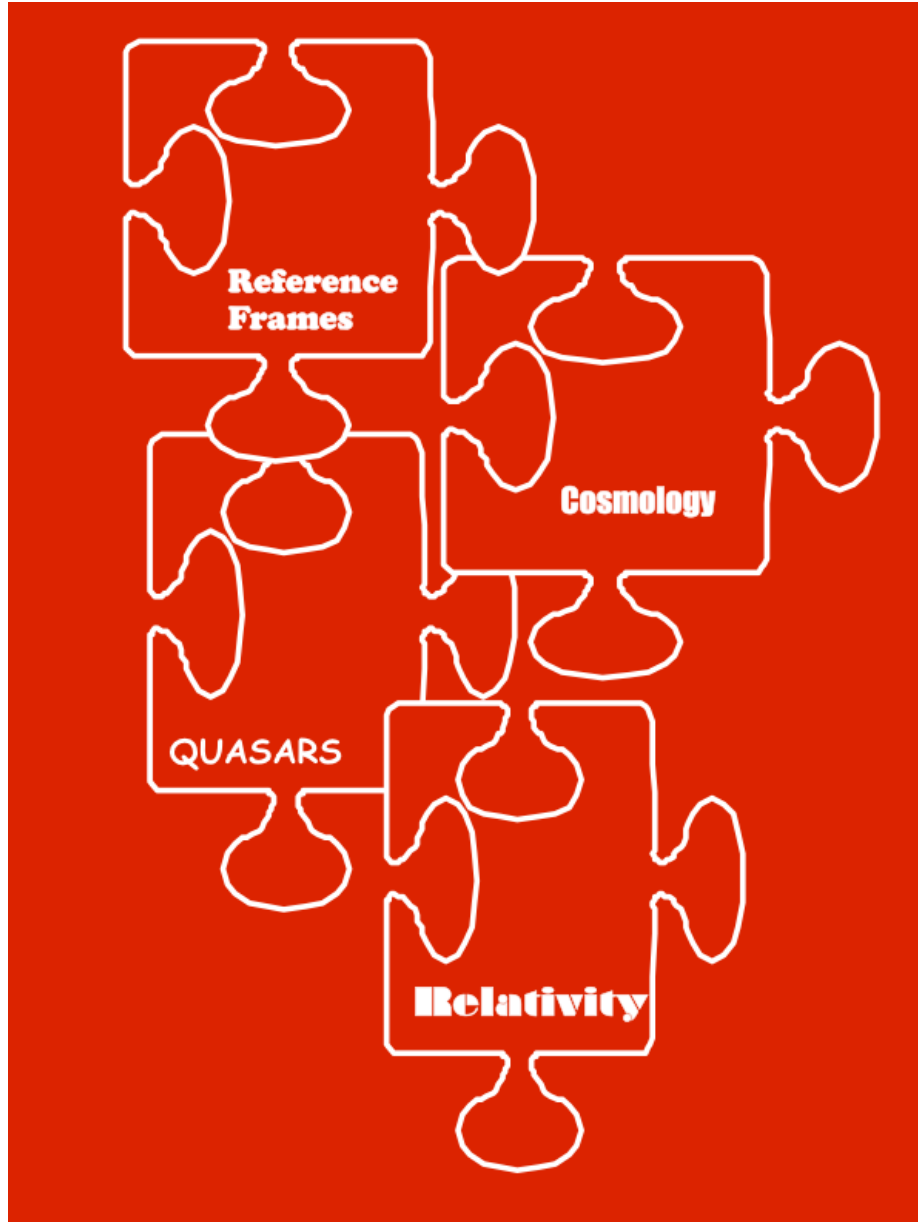
### **Description of the main results obtained**

The book of proceedings is composed by 32 papers, where 13 are review papers, 17 are contributed talks and 2 are posters see the index of the papers in the end of this document.

### **Future collaboration with host institution (if applicable)**

In order to keep the stimulated bridges between participants from different backgrounds, we planned a second visit, that will be centered (i) on the preparation of the proposal for those ideas that have been selected according to the spirit of the above GREAT working groups, and (ii) on the coordination of the related projects that we wish to implement, as continuation of the workshop. Specifically: an international school on the methods of Relativistic Astrometry and a meeting on Reference FrameQSO. Mariateresa Crosta will be hosted in Portugal.

to appear in Memorie della Societa' Astronomica Italiana, Vol 83 n. 3



# QSO Astrophysics, Fundamental physics, and Astrometric Cosmology in the Gaia era

*Porto-Portugal, June 6-9, 2011*

## **Scientific Organizing Committee**

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## **Organising Institute**

Centro de Investigação em Ciências Geo-Espaciais,  
Osservatorio Astronomico di Torino, INAF

## **Institutional Sponsorship**

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Research for European Astronomy Training.  
Osservatorio Astronomico di Torino, INAF  
Faculdade de Ciências da Universidade do Porto (FCUP)  
British Council

## **Local Support**

Departamento de Física e Departamento de Geociências, Ambiente e Ordenamento do  
Território, da FCUP

**QSO astrometry in the context of observational astrophysics**

Probing astrophysics, celestial reference frames, and general relativity

Norbert Bartel

QSO observations with Gaia: principles and applications

Francois Mignard

AGN astrophysics from comparing radio and Gaia optical astrometry

Ian Browne

Gaia Initial QSO Catalogue: The Variability and Compactness Indexes

Alexandre Andrei

Photocenter variability and AGN components

Sonia Anton

Binary Black Holes in nuclei of extragalactic radio sources

Jacques Roland

Detection of bright multiply imaged Quasars with GAIA

Francois Finet

RadioGalaxies with Gaia: the starburst-AGN duality

Brigitte Rocca

**QSO and the Reference Frame**

Quasometry, Its Use and Purpose

Valeri Makarov

The ICRF now and in the future

Patrick Charlot

Towards an accurate alignment of the VLBI frame and the future Gaia optical frame –  
VLBI observations of weak extragalactic radio sources: Status and future plans

Geraldine Bourda

Effect of core-shifts on VLBI group-delays

Richard Porcas

The Contribution of X/Ka-band VLBI to Multi-wavelength Celestial Frame Studies

Ioana Sotuela

Recent VLBI Activities at the Korean VLBI Network

Taehyun Jung

The Large Quasar Astrometric Catalog (LQAC) : principle and construction

Jean Souchay

Optical observations of QSOs for the link of reference systems

Francois Taris

Radio–optical outlier quasars – a case study with ICRF2 and SDSS

Sandor Frey

### **Reference Frame and the fabric of Space-Time**

Astronomical relativistic reference systems and their application for astrometry

Sergei Klioner

Astrometric Reference Frames in the solar system and beyond

Sergei Kopeikin

Special Frames in General Relativity: Applications to the 1PN Approximation

Donato Bini

Physical measurements in general relativity: a new effect

Fernando deFelice

Using Ring Laser Systems to Measure Gravitomagnetic Effects on Earth

Matteo Ruggiero

Light deflection for relativistic space astrometry in closed form

Stefano Bertone

Time transfer function in static, spherically symmetric space-times

Pierre Teyssandier

Physics and Coordinates in competition in highly accurate measurements

Mariateresa Crosta

**Astrometric Cosmology**

Astrometric Cosmology

Mario Lattanzi

From LSS to the Milky Way Halo

Umma Abbas

Dark Energy and Dark Matter as Curvature Effects

Salvatore Capozziello

Testing a non-minimal coupling between matter and curvature

Jorge Paramos

Astrometric Experiments in Fundamental Physics

Alberto Vecchiato

Gravitation Astrometric Measurement Experiment Mario Gai

**Epistemology Implications of current theories of the Universe**

What if ... General Relativity is not the theory?

Orfeu Bertolami