# Maxime Chauvin

## Ph.D. in Astrophysics and Instrumentation

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### *Education & Diploma*

**2012** **Postdoctoral position on hard X-ray polarization**, University of Toulouse, Institut de Recherche en Astrophysique et Planétologie (IRAP)

**2011** **Ph.D. thesis in astrophysics and instrumentation**, University of Toulouse, Institut de Recherche en Astrophysique et Planétologie (IRAP)

Advisor: Dr. Jean-Pierre Roques (IRAP)
Title: Simulation of a long focal length Wolter-I telescope for hard X-ray astronomy. Application to the Simbol-X and PheniX space missions.
Abstract: I have developed a simulation which reproduces a grazing incidence telescope subject to deformation. This tool has been used in the framework of the Simbol-X mission (CNES/ASI/EADS-Astrium) for optical performance assessments and optimization. My work on the extension of focalization up to 200 keV has led to the design of the PheniX project (ESA M3 call).

**2007** **Master in astrophysics and space sciences**, University of Toulouse and engineering school SUPAERO (ISAE Toulouse)
Courses titles: classical physics, nuclear physics, plasma physics, orbital mechanics

**2005** **Bachelor's degree in physics**, University of La Rochelle
Courses titles: quantum physics, mathematics, optics, waves, statistical physics

### *Further Training*

Training by the French space agency (CNES), spacecraft techniques and technology

### *Skills*

Scientific experience:

- Modeling of CdTe pixel camera for X-ray astronomy using Monte-Carlo methods
- Modeling the optical layout of a depth graded multilayer Wolter-I optics for keV photons
- Development of a full ray trace of a hard X-ray telescope subject to deformations along with the associated image reconstruction algorithm
- Development of an interface between the telescope simulator and the detector payload onboard software of the Simbol-X hard X-ray mission
- Support EADS/Astrium on their optical design optimization of the IXO mission
- Elaboration of a mission proposal, PheniX (a new hard X-ray telescope)
- Geant4 modeling (mass model of Integral/SPI including polarized physics)
- Polarization analysis in the hard X-ray domain with Integral/SPI

Scientific background:

- University studies in theoretical physics (quantum physics, relativity, nuclear physics, plasma physics, statistical physics)
- 4 years in a multidisciplinary laboratory (high energy physics, cosmology and planetary science)

Communication:

- Oral presentations in international conferences
- Group meetings with CNES, CEA, ASI and Astrium for Simbol-X and PheniX studies
- Public outreach in a festival of astronomy

Computer skills:

- Programming: Fortran, C, C++, Geant4, Matlab, Shell, Python
- Redaction: LaTeX, Microsoft Office, Open Office
- Image processing: FitsView, IDL
- Operating systems: Solaris, Linux, Windows, Mac OS
- Communication: PowerPoint, audio/video editing, 3D modeling

Foreign languages:

- English: TOEIC: 865/990 (2009), fluent

## *Interests and Activities*

- Volunteer and counselor in the Astronomy festival of Fleurance
- Astro-photography with the T60 telescope of the "Pic du midi" observatory
- Sports: swimming, road cycling, running (triathlon, marathon), trekking

## *Selected Publications*

Mission proposal to ESA in the framework of the 2011 M3 call:

Roques, J.P. et al., "PheniX: a new vision for the hard X-ray sky", Exp. Astron., DOI 10.1007/s10686-011-9236-3 (2011)

Publications in refereed journals:

Hanlon, L. et al., "Search for polarization from the prompt gamma-ray emission of GRB 120711", in prep. (2013)

Chauvin, M. et al., "Polarimetry in the Hard X-ray domain with INTEGRAL SPI", (2013) (Submitted in ApJ)

Jourdain, E. et al., "Separation of two contributions to the high energy emission of Cygnus X-1: Polarization measurements with INTEGRAL SPI", arXiv:1210.4783 (2012) (Accepted in ApJ)

Chauvin, M., Roques, J.P., "DynamiX, numerical tool for design of next-generation X-ray telescopes", Appl. Opt., 49, 4077 (2010)

Conference proceedings:

Chauvin, M. et al., "Simulation of the Simbol-X telescope: imaging performance of a deformable X-ray telescope", Proc. SPIE, 7437, 53 (2009)

Technical reports in the framework of international projects:

Chauvin, M. et al., "Blurring contribution due to defocus", SX-TR-OB-28-CESR (2009)

## *Referees*

**Jean-Pierre Roques,** Directeur de Recherche CNRS (IRAP), jean-pierre.roques@irap.omp.eu
**Philippe Laurent,** Engineer (CEA Saclay), philippe.laurent@cea.fr
**Pietro Ubertini,** Dirigente di Ricerca INAF (IASF Roma), pietro.ubertini@iasf-roma.inaf.it
**Olivier La Marle,** Engineer (CNES Paris), olivier.lamarle@cnes.fr
**Hélène Boithias,** Engineer (Astrium Toulouse), helene.boithias@astrium.eads.net