

## Johan RICHARD

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## Research Positions

**Since Sep. 2008:** Marie-Curie postdoctoral fellow, Durham University  
Sep. 2005 - Sep. 2008: Postdoctoral scholar in observational cosmology at the California Institute of Technology (CalTech), under the supervision of Richard Ellis.

## PhD thesis (2005) - Toulouse (LATT)

Properties of the first stars and galaxies - constraints on galaxy formation models.  
*Supervisors : Roser Pelló, Jean-Paul Kneib.*

## Education

Jul. 2002 - Sep. 2005 : PhD thesis of the University Paul Sabatier (Toulouse) at LATT.  
Sep. 2001 - Jun. 2002 : Master of Astrophysics at the University Paul Sabatier (Toulouse)  
Sep. 1999 - Sep. 2002 : Engineer Degree of Sup'Aéro (Space Techniques).

## Research Experience

Mar.-Jun. 2002 : Master of Astrophysics training at Caltech and LATT.  
High redshift Lyman- $\alpha$  emitters highly magnified by lensing clusters.  
*Supervisors : Richard Ellis, Jean-Paul Kneib.*

Jun.-Aug. 2001 : Research training at LATT (Toulouse), within the cosmology group.  
Study of a sample of lensing galaxy clusters at  $z \sim 0.2$ .  
*Supervisor : Jean-Paul Kneib*

Jul.-Aug. 2000 : Research training at IAP (Paris), within the high energy astrophysics group.  
Numerical precision in a simulation code of primordial nucleosynthesis.  
*Supervisor : Elisabeth Vangioni-Flam.*

## Knowledge

- **Languages:** French, English, Spanish fluent, German and Japanese good knowledge
- **Computing skills :** Unix/Linux/Windows/MacOS, C, C++, Java, HTML, Fortran, UML, Perl, LaTeX, IRAF, IDL.
- **Observations:** I am a regular observer at Keck with LRIS, ESI, DEIMOS, NIRSPEC, NIRC, at ESO/VLT with ISAAC, at Magellan with LDSS2/LDSS3, at Subaru with MOIRCS, in optical and near-IR imaging and spectroscopy.

- **Data Reduction:** standard reduction procedures for imaging and spectroscopic data (both ground- or space-based), and number of specific developments with IRAF, Perl, and IDL routines
- **Instrumentation:** software development for the Simulator of EMIR on Grantecan, as part of my PhD thesis. Simulations for EAGLE (future instrument on EELT)

## Experience in Teaching and Training

- 50 hrs of practical works in Physics, Level 2, Durham, 2009
- 15 hrs of practical works in the course of 'Introduction to Statistical Physics and Astrophysical Applications' at Sup'Aéro (H.D. level, 2003)
- Advisor or co-advisor of 8 students (Summer Research Fellows at Caltech, Master of astrophysics students in Toulouse)
- 200 hours of computing support at Sup'Aéro (2001-2002)
- Counselor in an astronomical summer camp in Toulouse (2000-2003): observations, lectures on 'Stellar Physics', 'Astrophysical Methods', 'Astrophysical distances', and practical workshops.

## Grants and PI-ship

- PI of HST grant # 11160 (cycle 16). *Escape fraction and stellar populations in a highly magnified Lyman-Break Galaxy*: \$24,000
- Admin-PI of HST grants # 10881 (cycle 15) and # 11312 (cycle 16). *LoCuSS - The Ultimate Gravitational Lensing Survey of Cluster Mass and Substructure*: \$109,000
- PI of 7 observing programs at Keck and 2 observing programs at Palomar
- PI of ESO program 60.A-9443 (Xshooter-SV)
- PI of ESO program 85.B-0848 (SINFONI)
- PI of JCMT/SCUBA2 program M09BI136

## Tasks of general interest

- In charge of the computers for the observing cosmology group at Caltech (2005-2008)
- Organizer of the weekly talks at Caltech (2007-2008)
- Member of the LOC at the "Gravitational lensing" colloquium in Aussois (2003)
- Referee for the Astrophysical Journal (2007-2009)

## Johan RICHARD - List of Publications - 900+ citations - H-index=17

### Articles submitted to refereed journals (on astro-ph or available on demand)

1. Jullo, E., Kneib, J.P., Natarajan, P., D'Aloisio, A., Limousin, L., **Richard**, J. & Schimd, C., *Cosmological constraints from strong gravitational lensing in clusters of galaxies*, sub. Science
2. Donnarumma, A. et al., *Abell 611 II. X-ray and strong lensing analyses*, sub. to A&A
3. Ivison, R., Smail, I., Papadopoulos, P., Wold, I., **Richard**, J. and 3 coauthors, *Gas, dust and stars in the SCUBA galaxy, SMMJ02399-0136: the EVLA reveals a colossal galactic nursery*, sub. to MNRAS, astro-ph/0912.1591
4. Swinbank, M., Smail, I., Longmore, S., Harris, A., Baker, A., de Breuck, C., **Richard**, J. and 15 coauthors, *The first direct size and luminosity measurements of HII regions within a star-forming galaxy at  $z \sim 2$* , sub. to Nature.
5. Jones, T., Swinbank, M., Ellis, R., **Richard**, J., Stark, D., *Resolved Spectroscopy of Gravitationally-Lensed Galaxies: Recovering Coherent Velocity Fields in Sub-Luminous  $z$  2-3 Galaxies*, sub. to MNRAS, astro-ph/0910.4488
6. Matsuda, Y., **Richard** J. and 8 coauthors, *A search for galaxies in and around an HI overdense region at  $z=5$* , sub. to MNRAS.
7. Limousin, M., Ebeling, H., Ma., C., Swinbank, M., Smith, G., **Richard**, J. and 6 coauthors, *MACSJ1423.8+2404: Gravitational Lensing by a Massive, Relaxed Cluster of Galaxies at  $z = 0.54$* , sub. to MNRAS, astro-ph/0911.4125
8. Limousin, M., Jullo, E., **Richard**, J., Cabanac, R., Kneib, J.P., Gavazzi, R., Soucail, G., *Strong Lensing as a Probe of the Mass Distribution Beyond the Einstein Radius. Mass & Light in SL2S J0544-0121, a Galaxy Group at  $z=0.35$* , sub. to A&A., astro-ph/0906.4118
9. Massey, R., **Richard**, J. & Kitching T., *The lensing view of Dark Matter*, review sub. to RPP
10. Elíasdóttir, Á., Limousin, M., **Richard**, J., and 6 coauthors, *Where is the matter in the Merging Cluster Abell 2218 ?*, sub.to ApJ, astro-ph/0710.5636

### Accepted refereed publications (published / in press)

1. **Richard**, J. and 15 coauthors, *LoCuSS: First Results from Strong-lensing Analysis of 20 Massive Galaxy Clusters at  $z \sim 0.2$* , sub. to MNRAS, astro-ph/0911.3302
2. **Richard**, J., Kneib, J.P., Limousin, M., Edge, A., Jullo, E., *Abell 370 revisited: refurbished Hubble imaging of the first strong lensing cluster*, 2010, MNRAS in press, astro-ph/0910.5553
3. Maizy, A., **Richard**, J., De Leo, M., Pello, R., Kneib, J.P., *Looking for the first galaxies: Lensing or blank fields?*, 2010, A&A in press, astro-ph/0910.4910
4. Newman, A. et al., *The Distribution of Dark Matter Over Three Decades in Radius in the lensing cluster Abell 611*, 2009, ApJ, 706, 1078
5. Smith, G. et al., *Hubble Space Telescope Observations of a Spectacular New Strong-lensing Galaxy Cluster - MACSJ1149.5+2223 at  $z=0.544$* , 2009, ApJ, 707, 163

6. Knudsen, K., Kneib, J.P., **Richard**, J., Petitpas, G. & Egami, E. *Physical properties and morphology of a newly identified compact  $z=4.04$  submm lensed galaxy in Abell 2218*, 2010, ApJL in press, astro-ph/0911.2004
7. Swinbank, M., Webb, T., **Richard**, J. and 8 coauthors, *A spatially resolved map of the kinematics, star formation and stellar mass assembly in a star-forming galaxy at  $z = 4.9$* , 2009, MNRAS 400, 1121
8. Goobar, A., et al., *Near-IR Search for Lensed Supernovae Behind Galaxy Clusters. II. First detection and future prospects*, 2009, A&A 507, 71
9. Stanyshev, V. et al., *Near-IR search for lensed supernovae behind galaxy clusters. I. Observations and transient detection efficiency*, 2009, A&A, 507, 61
10. Marrone, D., Smith, G., **Richard**, J. and 19 coauthors, *LoCuSS: A Comparison of Sunyaev-Zel'dovich Effect and Gravitational-Lensing Measurements of Galaxy Clusters*, 2009, ApJ 701, 114
11. Limousin, M., Cabanac, R., Gavazzi, R., Kneib, J.P., Motta, M. **Richard**, J., and 18 coauthors, *A New Window of Exploration in the Mass Spectrum: Strong Lensing by Galaxy Groups in the SL2S*, 2009, A&A, 505, 445
12. Siana, B., Smail, I., Swinbank, M., **Richard**, J., and 6 coauthors, *Detection of PAH and far-infrared emission from the Cosmic Eye: probing the dust and star formation of Lyman-Break Galaxies*, 2009, ApJ, 698, 1273
13. **Richard**, J., Pei, L., Limousin, M., Jullo, E., Kneib, J.P., *Keck spectroscopic survey of strongly lensed galaxies in Abell 1703: further evidence for a relaxed, unimodal cluster*, 2009, A&A, 498, 37
14. Covone, G., et al., *Gauging the dark matter fraction in a  $L^*$  S0 galaxy at  $z = 0.47$  through gravitational lensing from deep HST/ACS imaging*, 2009, ApJ, 691, 531
15. Stark, D., Swinbank, M., Ellis, R., Smail, I., **Richard**, J. & Dye, S., *Resolving the Formation of the First Galactic Disks*, 2008, Nature, 455, 775
16. **Richard**, J., Stark, D., Ellis, R., George, M., Kneib, J.P., Smith, G.,  *$z > 7$  lensed dropout candidates found in a HST/Spitzer Survey*, 2008, ApJ, 685, 705
17. Limousin, M., **Richard**, J., and 10 coauthors, *Strong lensing in Abell 1703: Constraints on the Slope of the Inner Dark Matter Distribution*, 2008, A&A, 489, 23
18. Tu, H., Limousin, L., Fort, B., Shu, C., Sygnet, F., Jullo, E., Kneib, J.P. & **Richard**, J., *Probing the slope of cluster mass profile with gravitational Einstein rings: application to Abell 1689*, 2008, MNRAS, 386, 1169
19. Rigby, J., Marcillac, D., Egami, E., Rieke, G., **Richard**, J., and 7 coauthors, *Mid-infrared spectroscopy of lensed galaxies at  $1 < z < 3$ : the nature of sources near the MIPS confusion limit*, 2008, ApJ, 675, 262
20. Hempel, A., Schaerer, D., Egami, E., Pelló, R., Wise, M., **Richard**, J., Le Borgne, J.F., Kneib, J.P., *EROs found behind lensing clusters. I. Classification of EROs based on various colour criteria*, 2008, A&A 477, 55
21. Coppin, C. et al., *A detailed study of Gas and Star Formation in a Highly Magnified Lyman Break Galaxy at  $z=3.07$* , 2007, ApJ, 665, 936.

22. Schaerer, D., Hempel, A., Egami, E., Pelló, R., **Richard**, J. and 4 coauthors, *EROs found behind lensing clusters. II. Stellar populations and dust properties of optical dropout EROs and comparison with related objects*, 2007, A&A, 469, 47 et A&A 476, 97.
23. Limousin, M., **Richard**, J. and 15 coauthors, *Solving the Abell 1689 puzzle: A combined strong and weak gravitational lensing analysis*, 2007, ApJ, 668, 643.
24. **Richard**, J., and 10 coauthors, *A statistical study of multiply-imaged systems in the lensing cluster Abell 68*, 2007, ApJ, 663, 10
25. Stark, D., Ellis, R., **Richard**, J., Kneib, J.P., Smith, G., Santos, M., *A Keck survey for Gravitationally-Lensed Lyman  $\alpha$  emitters in the redshift range  $8.5 < z < 10.4$ : new constraints on the contribution of low luminosity sources to cosmic reionization*, 2007, ApJ, 663, 10.
26. Smail, I., Swinbank, M., **Richard**, J. and 8 coauthors, *A very bright, highly magnified Lyman-break galaxy at  $z=3.07$* , 2007, ApJ, 654, L33
27. Cortese, L., Marcillac, D., **Richard** J. and 8 coauthors, *The strong transformation of spiral galaxies infalling into massive clusters at  $z \sim 0.2$* , 2007, MNRAS, 376, 157.
28. **Richard**, J., Pelló, R., Schaerer, D., Le Borgne, J., Kneib, J.P., *Constraining the abundance of  $z \gtrsim 6$  star-forming galaxies with deep near-IR images of lensing clusters*, 2006, A&A, 456, 861.
29. Covone, G., Kneib, J.P., Soucail, G., **Richard**, J., Ebeling, H., *VIMOS integral field spectroscopy of the strong lensing cluster Abell 2667*, 2006, A&A, 456, 409.
30. Lamareille, F., Contini, T., Brinchmann, J., Le Borgne, J.F., Charlot, S., **Richard**, J., *Spectrophotometric properties of galaxies at intermediate redshifts II - The Luminosity-Metallicity relation*, 2006, A&A 448, 907.
31. Lamareille, F., Contini, T., Le Borgne, J.F., Brinchmann, J., Charlot, S., **Richard**, J., *Spectrophotometric properties of galaxies at intermediate redshifts I - Sample description, photometric properties and spectral measurements*, 2006, A&A 448, 893.
32. Egami, E., Kneib, J.P., Rieke, G., Ellis, R., **Richard**, J., and 8 coauthors, *Spitzer and Hubble constraints on the Physical Properties of the  $z \sim 7$  Galaxy strongly lensed by Abell 2218*, 2005, ApJ, 618, L5.
33. Pelló, R., Schaerer, D., **Richard**, J., Le Borgne, J.F., Kneib, J.P., *ISAAC/VLT observations of a lensed galaxy at  $z = 10.0$* , 2004, A&A, 416, L35.
34. Kneib, J.P., Ellis, R., Santos, R. & **Richard**, J., *A probable  $z \sim 7$  galaxy strongly lensed by the rich cluster Abell 2218: exploring the dark ages*, 2004, ApJ, 607, 697.
35. Santos, M., Ellis, R., Kneib, J.P., **Richard**, J., Kuijken, K., *The abundance of low-luminosity Lyman alpha emitters at high redshift*, 2004, ApJ, 606, 683.
36. **Richard**, J., Schaerer, D., Pelló, R., Le Borgne, J., Kneib, J.P., *Discovery of a faint R-band drop-out: a strongly reddened lensed star-forming galaxy at  $z = 1.68$* , 2003, A&A, 412, L57.

**Conference proceedings: 45+**

## SPIE conferences

1. **Johan Richard**, Sylvie Brau-Nogué, S'ebastien Baratchart, Hervé Valentin, Roser Pelló, *The EMIR observing program manager system: optimized slits positioner*, SPIE 2006, 6274, 56
2. **Johan Richard**, Roser Pelló, Thierry Contini, Sylvie Brau-Nogué, Christian Lucuix, *The EMIR observing program manager system science simulator*, Conference SPIE *Astronomical Telescopes and Instrumentation*, 21-25 Juin 2004, Volume 5493, pp. 373-381.

## Other publications

1. Daniel Schaerer, Roser Pelló, **Johan Richard**, Eiichi Egami, Angela Hempel, Jean-François Le Borgne, Jean-Paul Kneib, Michael Wise, Frédéric Boone, Françoise Combes, *Searching for the first galaxies through gravitational lenses*, ESO Messenger 125 (2006)

## Technical reports

1. Pablo López Ramos, Thierry Contini, **Johan Richard**, Roser Pelló, *EMIR Coordinate Operations*, Jan. 2005.
2. Sylvie Brau-Nogué, **Johan Richard**, Thierry Contini, Roser Pelló, *EMIR Keywords Dictionary*, Dec. 2004.
3. Sylvie Brau-Nogué, **Johan Richard**, Roser Pelló, Christian Lucuix, Thierry Contini, *EMIR Observing Program Management System Use-Case Model*, Dec. 2003.

## Press Releases

1. BBC/UK: Mark Swinbank, Tracy Webb, **Johan Richard**, et al., *A spatially resolved map of the kinematics, star formation and stellar mass assembly in a star-forming galaxy at  $z = 4.9$* , Oct. 2008
2. RAS/Caltech/Keck Obs.: Daniel Stark, Mark Swinbank, Richard Ellis, Ian Smail, **Johan Richard**, *Resolving the Formation of the First Galactic Disks*, Oct. 2008
3. NASA/ESA: **Johan Richard**, Daniel Stark, Richard Ellis, Eiichi Egami, Jean-Paul Kneib, Graham Smith, *Lenses galore - Hubble finds large sample of very distant galaxies*, Aug. 2008
4. RAS/Keck Obs./Caltech/CNRS: Daniel Stark, Richard Ellis, **Johan Richard**, Jean-Paul Kneib, Graham Smith, Michael Santos, *A Keck Survey for Gravitationally Lensed Ly $\alpha$  emitters in the redshift range  $8.5 < z < 10.4$* , Jul. 2007
5. NASA/ESA/Caltech/Keck Obs.: Luca Cortese, Delphine Marcillac, **Johan Richard**, et al., *Hubble sees Comet Galaxy being ripped apart by galaxy cluster*, Feb. 2007.
6. NASA/ESA/Keck Obs. : Jean-Paul Kneib, Richard Ellis, Michael Santos, **Johan Richard**, *Hubble and Keck team up to find farthest known galaxy in the Universe*, Feb. 2004.
7. ESO/CNRS : Roser Pelló, Daniel Schaerer, **Johan Richard**, Jean-François Le Borgne, *VLT Smashes the Record of the Farthest Known Galaxy*, Feb. 2004.