

# Gaspard Duchêne

Associate Research Astronomer and Lecturer at UC Berkeley

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## POSITIONS HELD

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2016–.. Associate Research Astronomer at University of California, Berkeley  
2010–.. Lecturer at University of California, Berkeley  
2007–16 Assistant Research Astronomer at University of California, Berkeley  
2003–07 Associate Astronomer at Observatoire de Grenoble (France)  
2003–04 Adjunct Assistant Professor at University of California, Los Angeles  
2000–03 Postdoctoral position at University of California, Los Angeles  
1997–2000 Ph.D. student at Laboratoire d’Astrophysique de Grenoble;  
Teaching Assistant in Physics at Grenoble University

## EDUCATION

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July 2000 Ph.D. thesis in Astrophysics, *Young binary systems and their nearby environment: high-angular resolution observations*, Grenoble University, supervisors: Dr. Jérôme Bouvier & Dr. François Ménard  
June 1997 MAs in Astrophysics (“D.E.A.”) and in Physics (“Magistère”), Grenoble University

## PUBLICATIONS

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– 27 first-authored refereed articles published or in press  
– 172 co-authored refereed articles published or in press  
– 19 invited reviews and talks in international conferences, workshops and summer schools  
– 30 contributed talks and posters in international conferences  
– 1 invited book review

## TEACHING EXPERIENCE

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2016–22 Lower class course on *General Astronomy* (UC Berkeley)  
2014–15 Lower class course on *The Planets* (UC Berkeley)  
2013 Graduate seminar on *Adaptive Optics* (UC Berkeley)  
2010–22 Upper class lab course *Optical/Infrared Astronomy Lab* (UC Berkeley)  
May 2007 Lectures on *High angular resolution imaging of disks and planets* (VLTI Summer School)  
June 2006 Lecture and Lab on *Preparation of VLTI observations* (VLTI Summer School)  
2003–07 Upper class course *Stellar Evolution* (Grenoble Université Alpes)  
Upper class lab course *Astronomical Observations* (Grenoble Université Alpes)  
Lower class discussion section *Introduction to Astronomy* (Grenoble Université Alpes)  
2003–04 Lower class course *Introduction to Astronomy* (UCLA)  
June 2000 Lecture on *Young multiple systems at high angular resolution* (CNRS Summer School)  
1997–2000 Lower class lab course *Introductory Physics* (Grenoble Université Alpes)

PROFESSIONAL SERVICE AND MEMBERSHIPS

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- Referee for *Nature*, *ApJ*, *ApJL*, *AJ*, *A&A*, *A&AL*, *MNRAS* and *Science Advances*
- Member of the UC Keck Galactic Telescope Allocation Committee (2014–20; panel chair: 2016–20)
- Member of the Gemini Long and Large Program Telescope Allocation Committee (2016–17)
- Panel member for HST proposals review process (2010)
- Panel member for NSF AAG program (undisclosed dates)
- External expert for NASA XRP and EW grant programs (2015), the NASA Postdoctoral Fellowship program (2015 - ..), the Netherlands Organisation for Scientific Research (2009), the Belgium FP7–COFUND program (2014), the French Agence Nationale pour la Recherche (2011, 2013), the Swiss National Science Foundation (2017), the Chilean FONDECYT (2019), the Belgian Fund for Scientific Research FNRS (2021)
- Adaptive Optics Seminar organizer at UC Berkeley (2008 - 2013)
- Astronomy Colloquium organizer at UCLA (Fall 2003)
- Public activities organizer at Observatoire de Grenoble (2004 - 2007)
- Member of the Selection Committee for UC Berkeley’s SURF program (2013 – 2015)
- User support coordinator for Jean-Marie Mariotti Center (2004 - 2007)
- Member of the American Astronomical Society since 2001
- Member of the Société Française d’Astronomie et d’Astrophysique since 2003

RESEARCH GRANTS AWARDED

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- 2022 Co-I of HST-GO program *Multiplicity among free-floating planets* (Cycle 30; PI: H. Bouy; \$40,300 Co-I share)
- 2022 0.4cm PI of HST-GO program *The diversity of protoplanetary disks: Imaging a complete sample of edge-on disks in four nearby star-forming regions* (Cycle 30; \$97,354 PI-share)
- 2022 0.4cm Co-I of JWST-GO program *Dust settling and grain evolution in edge-on protoplanetary disks* (Cycle 1; PI: F. Ménard; \$35,446 Co-I share)
- 2017 PI of NASA-XRP program *On the edge: Assessing the diversity of protoplanetary disks from a unique perspective* (\$390,097)
- 2016 PI of NSF-AAG program *Collaborative research: Tracing the evolution of Planetary Systems* (\$28,685)
- 2014 PI of NSF-AAG program *Extreme mass ratio multiple stellar systems: Understanding the origin of the brown dwarf desert and directly imaged planets* (\$268,171)
- 2014 Co-I of NSF-AAG program *First-Light Debris Disk Science with the Gemini Planet Imager* (PI: M. Fitzgerald, UCLA; \$88,087 subaward)
- 2014 PI of HST-GO program *Imaging the tenuous dusty atmosphere of edge-on protoplanetary disks* (\$58,446)
- 2012 Co-I of HST-GO program *Imaging Newly-Identified Edge-on Protoplanetary Disks in Nearby Star-Forming Regions* (PI: K. Stapelfeldt, NASA-GSFC; \$36,815 Co-I share)
- 2012 PI of AAS Small Research Grant *Demonstrating the scientific potential of FIRST, a fibered aperture masking instrument designed to characterize exoplanets* (\$5,000)
- 2010 Co-I on ANR program *Dynamical evolution of young stellar clusters* (PI: E. Moraux; €300,000 total)
- 2010 Co-I on ANR program *Formation and evolution planetary systems* (PI: C. Pinte; €150,000 total)
- 2007 Co-I on ANR program *Dusty Disks* (PI: F. Ménard; €500,000 total)
- 2006 Co-PI (with J. Graham, UCB) of France-Berkeley Fund program *Studying the properties of protoplanetary disks across wide ranges of stellar ages and masses* (\$9,000 total)

## REFEREED PUBLICATIONS

**199 articles published or in press. Since 2022:**

- A uniform analysis of debris disks with the Gemini Planet Imager. II. constraints on dust density distribution using empirically informed scattering phase functions*, Hom, Patience, Chen, **Duchêne** and 39 more co-authors, 2024, *MNRAS*, 528, 6959
- A uniform analysis of debris disks with the Gemini Planet Imager. I. An empirical search for perturbations from planetary companions in polarized light images*, Crotts, Matthews, **Duchêne**
- JWST imaging of edge-on protoplanetary disks. II. Appearance of edge-on disks with a tilted inner region: Case study of IRAS 04302+2247*, Villenave, Stapelfeldt, **Duchêne** and 6 more co-authors 2024, *ApJ*, 961, 95
- JWST imaging of edge-on protoplanetary disks. I. Fully vertically mixed 10  $\mu\text{m}$  grains in the outer regions of a 1000 au disk*, **Duchêne** and 8 more co-authors, 2024, *AJ*, 167, 77
- Single-aperture spectro-interferometry in the visible at the Subaru telescope with FIRST: First on-sky demonstration on Keho'oea ( $\alpha$  Lyrae) and Hokulei ( $\alpha$  Aurigae)*, Vievard, Huby, Lacour, Guyon, Cvetojevic, Jovanovic, Lozi, Barjot, Deo, **Duchêne** and 13 more co-authors, 2023, *A&A*, 677A, 84
- Giant impacts and debris disk morphology*, Jones, Chiang, **Duchêne** and 2 more co-authors, 2023, *ApJ*, 948, 102
- The ALMA view of MP Mus (PDS 66): A protoplanetary disk with no visible gaps down to 4 au scales* Ribas, Macías, Weber, Cuello, Dong, Aguayo, Cáceres, Carpenter, Dent, de Gregorio-Monsalvo, **Duchêne** and 3 more co-authors, 2023, *A&A*, 673A, 77
- Testing the interaction between a substellar companion and a debris disk in the HR 2562 system*, Zhang **Duchêne** and 52 more co-authors, 2023, *AJ*, 165, 219
- Demographics of protoplanetary disks: A simulated population of edge-on systems*, Angelo, **Duchêne**, and 10 more co-authors, 2023, *ApJ*, 945, 130
- Modest dust settling in the IRAS 04302+2247 Class I protoplanetary disk*, Villenave, Podio, **Duchêne** and 11 more co-authors, 2023, *ApJ*, 946, 70
- A low-mass companion desert among intermediate-mass visual binaries: The scaled-up counterpart to the brown dwarf desert*, **Duchêne** and 10 more co-authors, 2023, *MNRAS*, 519 778
- A machine learning framework to predict images of edge-on protoplanetary disks*, Telkamp, Martínez-Palomera, **Duchêne** and 4 more co-authors, 2022, *ApJ*, 939, 73
- StraKLIP: A novel pipeline for detection and characterization of close-in faint companions through the Karhunen-Loève Image Processing algorithm*, Strampelli, Pueyo, Aguilar, Aparicio, **Duchêne** & Robberto, 2022, *AJ*, 164, 147
- A multi-wavelength study of the highly asymmetric debris disk around HD 111520*, Crotts, Draper, Matthews, **Duchêne** and 6 co-authors, 2022, *ApJ*, 932, 23
- A highly settled disk around Oph163131*, Villenave, Stapelfeldt, **Duchêne** and 10 co-authors, 2022, *ApJ*, 930, 11
- Detection of near-infrared water ice at the surface of the (pre)transitional disk AB Aur: Informing icy grains abundance, composition, and size*, Betti, Follette, Jorquera, **Duchêne** and 16 co-authors, 2022, *AJ*, in press (arxiv:2201.08868)
- The effects of starspots on spectroscopic mass estimates of low-mass young stars*, Flores, Connelley, Reipurth and **Duchêne**, 2022, *ApJ*, 925, 21
- Detection and bulk properties of the HR 8799 planets with high resolution spectroscopy*, Wang, Rufio, Morris, Delorme, Jovanovic, Pezzato, Echeverri, Finnerty, Hood, Zanazzi, Bryan, Bond, Cetre, Martin, Mawet, Skemer, Baker, Xuan, Wallace, Wang, Bartos, Blake, Boden, Buzard, Calvin, Chun, Doppmann, Dupuy, **Duchêne**, and 23 more co-authors, 2022, *AJ*, 162, 148

**First-author articles prior to 2022:**

- The Gemini Planet Imager view of the HD 32297 debris disk*, **Duchêne**, and 63 more co-authors, 2020, *AJ*, 159, 251
- Is stellar multiplicity universal? Tight stellar binaries in the Orion Nebulae Cluster*, **Duchêne**, Lacour, Moraux, Goodwin & Bouvier, 2018, *MNRAS*, 478, 1825
- A search for passive protoplanetary disks in the Taurus-Auriga star-forming region*, **Duchêne**, Becker, Yang, Bouy, De Rosa, Patience & Girard, 2017, *MNRAS*, 469, 1783
- Herbig AeBe stars: Multiplicity and consequences*, **Duchêne**, 2015, *Ap&SS*, 355, 291
- Spatially resolved imaging of the two-component  $\eta$  Crv debris disk with Herschel*, **Duchêne**, Arriaga Wyatt, Kennedy, Sibthorpe, Lisse, Holland, Wisniewski, Clampin, Kalas, Pinte, Wilner, Booth, Horner, Matthews & Greaves, 2014, *ApJ*, 784, 148
- Substellar multiplicity in the Hyades cluster*, **Duchêne**, Bouvier, Moraux, Bouy, Konopacky & Ghez, 2013, *A&A*, 555A, 137
- Stellar multiplicity*, **Duchêne** & Kraus, 2013, *ARA&A*, vol. 51, 269
- Disks around pre-main sequence stars*, **Duchêne**, 2011, IAU Symposium 270, *Computational Star Formation*, J. Alves, B. Elmegreen, J. Girart & V. Trimble (eds.), Cambridge Univ. Press, 45
- Planet formation in binary systems: a separation-dependent mechanism?*, **Duchêne**, 2010, *ApJL*, 709, L114
- Panchromatic observations and modeling of the HV Tau C edge-on disk*, **Duchêne**, McCabe, Pinte, Stapelfeldt, Ménard, Duvert, Ghez, Maness, Bouy, Barrado y Navascués, Morales-Calderón, Wolf, Padgett, Brook & Noriega-Crespo, 2010, *ApJ*, 712, 112
- High angular resolution imaging of disks and planets*, **Duchêne**, 2008, *New Astron. Rev.*, 52, 117
- Multiple protostellar systems. II. A high resolution near-infrared imaging survey in nearby star-forming regions*, **Duchêne**, Bontemps, Bouvier, André, Djupvik & Ghez, 2007, *A&A*, 476, 229
- New observational frontiers in the multiplicity of young stars*, **Duchêne**, Delgado-Donate, Haisch, Loinard & Rodríguez, 2007, in *Protostars & Planets V*, B. Reipurth, D. Jewitt, and K. Keil (eds.), Univ. of Arizona Press, p. 379
- Preparation of VLTI observations*, **Duchêne** & Duvert, 2007, *New Astron. Rev.*, 51, 650
- Accurate stellar masses in the multiple system T Tauri*, **Duchêne**, Beust, Adjali, Konopacky & Ghez, 2006, *A&A*, 457, L9
- The circumstellar environment of T Tauri S at high spatial and spectral resolution*, **Duchêne**, Ghez, McCabe & Ceccarelli, 2005, *ApJ*, 628, 832
- Multiple protostellar systems. I. A deep near infrared survey of Taurus and Ophiuchus protostellar objects*, **Duchêne**, Bouvier, Bontemps, André & Motte, 2004, *A&A*, 427, 651
- A multiwavelength scattered light analysis of the dust grain population in the GG Tauri Circumbinary Ring*, **Duchêne**, McCabe, Ghez & Macintosh, 2004, *ApJ*, 606, 969
- No fossil disk in the T Tauri multiple system V773 Tauri*, **Duchêne**, Ghez, McCabe & Weinberger, 2003, *ApJ*, 592, 288
- A layered edge-on circumstellar disk around HK Tau B*, **Duchêne**, Ménard, Stapelfeldt & Duvert, 2003, *A&A*, 400, 559
- Resolved Near-Infrared Spectroscopy of the Mysterious Pre-Main-Sequence Binary System T Tauri S*, **Duchêne**, Ghez & McCabe, 2002, *ApJ*, 568, 771
- Visual binaries among high-mass stars. An adaptive optics survey of OB stars in the NGC 6611 cluster*, **Duchêne**, Simon, Eisloffel & Bouvier, 2001, *A&A*, 379, 147
- Accretion in Taurus PMS binaries: a spectroscopic study*, **Duchêne**, Monin, Bouvier & Ménard, 1999, *A&A*, 351, 954
- Low-mass binaries in the young cluster IC 348: implications for binary formation and evolution*, **Duchêne**, Bouvier & Simon, 1999, *A&A*, 343, 831
- Binary fraction in low-mass star forming regions: a reexamination of the possible excesses and implications*, **Duchêne**, 1999, *A&A*, 341, 547

## INVITED REVIEWS AND TALKS IN INTERNATIONAL CONFERENCES \_\_\_\_\_

**19 invited reviews and talks in international conferences and summer schools. Since 2008:**

- Disks in multiple stellar systems*, in *Great Barriers in Planet Formation*, **Duchêne**, Cairns, July 2019
- Characterizing dust in debris disks: recent advances and unsolved issues*, in *Cosmic Dust XII*, **Duchêne**, Tokyo, August 2018
- Herbig AeBe stars: multiplicity*, ESO workshop on *Herbig AeBe stars: the missing link in star formation* **Duchêne**, Santiago de Chile, April 2014
- Multiplicity in the early phases of stellar evolution*, **Duchêne**, ESO-MPE-USM-MPA workshop on *Formation and early evolution of very low mass stars and brown dwarfs*, Garching, October 2011
- Disks around pre-main sequence stars*, **Duchêne**, 2011, IAU Symposium 270, *Computational Star Formation*, J. Alves, B. Elmegreen, J. Girart & V. Trimble (eds.), Cambridge Univ. Press, 45
- High-resolution disk observations*, **Duchêne**, OPTICON/FP7 workshop on *Circumstellar disks and planets – Science cases for next-generation optical/infrared long-baseline interferometers*, Wolf, Malbet, Alexander, Berger, Creech-Eakman, **Duchêne**, Dutrey, Mordasini, Pantin, Pont, Pott, Tatulli & Testi, *A&A Rev.*, 20, 52
- Scattered light images of protoplanetary and debris disks*, **Duchêne**, ESO-MPE-MPA-USM Workshop, *From circumstellar disks to planetary systems*, Garching, November 2009
- Stellar multiplicity and the prospects for planet formation*, **Duchêne**, IAU General Assembly Special Session on *Young stars, brown dwarfs and protoplanetary disks*, Rio de Janeiro, August 2009, in *Highlights of Astronomy*, I. Cobertt, J. Gregorio-Hetem, and S. Alencar (eds.), Cambridge Univ. Press, 15, 764
- Observational properties of disks and young stellar objects*, **Duchêne**, Ménard, Muzzerolle & Mohanty, 2009, in *Structure Formation in Astrophysics*, G. Chabrier (Ed.), Cambridge Univ. Press, 323
- The observed multiplicity of low-mass stars: from embedded protostars to open clusters*, **Duchêne** & Bouvier, 2008, in *Multiple stars accross the H-R diagram*, ESO Astrophysics Symposia, Springer-Verlag Berlin Heidelberg, p. 219

**1 invited book review:**

- Review of “*Adaptive Optics for Biological Imaging*” edited by Joel A. Kubby, **Duchêne**, 2014, *BioMedical Engineering OnLine*, 13, 14