Johan MAZOYER

Research Interests: Optical Instrumentation, Direct Imaging & Coronagraphy, Observation & Characterization of Extrasolar Systems, Debris Disks

1 RESEARCH POSITIONS

CNRS Scientist – **LESIA/Paris Observatory** (France) **Since 2020**

Sagan Fellow – **Jet Propulsion Laboratory** (Pasadena, CA) **2018 - 2019**

Postdoc – **Johns Hopkins University** (Baltimore, MD) **2016 - 2018**

Postdoc – **Space Telescope Science Institute** (Baltimore, MD) **2014 - 2016**

Graduate Student – **LESIA/Paris Observatory** (France) **2011 - 2014**

2 EDUCATION

PhD – Astronomy & Astrophysics – **Université Paris Diderot** (France) **2014**
Thesis Advisors: P. Baudoz & G. Rousset
Thesis: High-Contrast Direct Imaging Of Exoplanets And Circumstellar Disks

Master – Astrophysics – **Université Paul Sabatier** (Toulouse, France) **2011**
Master Thesis Advisors: O. Gasnault & R. Wiens
Thesis: Influence of Mars atmosphere on the ChemCam abundance detection limits

Master – Space Engineering – **ISAE Supaero** (Toulouse, France) **2011**

Bachelor – Computer Science – **Ecole polytechnique** (Paris, France) **2010**

3 GRANTS & AWARDS

Carl Sagan Fellowship (NASA Hubble Fellowship Program) – 3 yrs **2018**

Cover of **Astronomy & Astrophysics** Journal (Volume 564) **2014**

Outstanding Presentation Award (CNES fellow symposium JC^2) **2013**

CNES Doctoral Research Fellowship (French space agency) – 3 yrs **2011**

Ecole Polytechnique Scholarship – 4 yrs **2007**

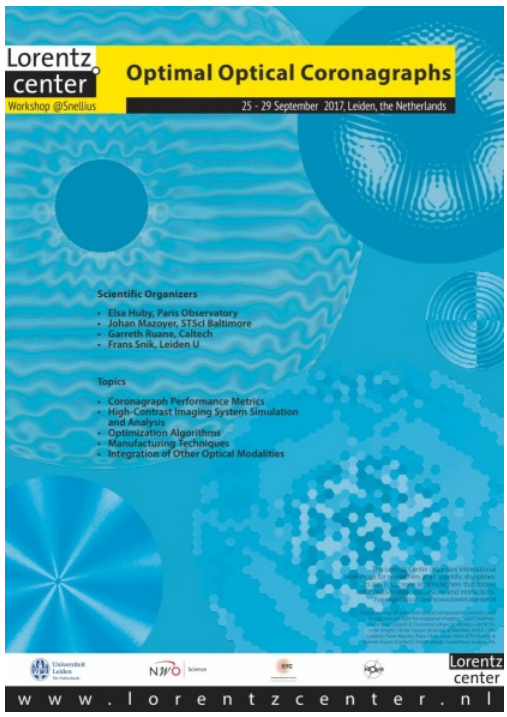
4 OUTREACH

Podcast Science: I am running **PodcastScience.fm**, a **general science program**, airing every Wednesdays, in french. This podcast is listened by 10'000 to 20'000 listeners. Podcast Science received the Golden blog award for best scientific blog in 2012.

Kidi'Science: Contributor for this children science blog.

Public talks: CERN & Palais de la découverte (Paris)

5 PROFESSIONAL ACTIVITIES & SERVICE



Conference and Workshop Organizer:

- Organizer and SOC: **National Capital Area Disks** workshop (Baltimore, MD, Oct. 2018) - website
- Organizer and SOC: **Optimal Optical Coronagraphs** workshop (Leiden, NL, Sep. 2017) - website
- SOC: **High Contrast Imaging from Space** (Baltimore, MD, Nov. 2016) - website
- LOC: **La très haute dynamique** workshop (Paris, FR, 2012)

Other Services:

- **Hubble *Telescope Allocation Committee*** panel support (2016).
- NASA Exoplanet Exploration Program Analysis Group (ExoPAG) member of the **Study Analysis Groups (SAGs) #19** (Theory and Rigorous Contrast Metrics) since 2016 (see Jensen-Clem et al. 2018).
- Organization of the **"Exoplanet Star and Planet Formation" (ESPF) seminar** at STScI each week (2016-2018) - website
- Development of the **Paris THD optical testbed website** in August 2014.
- IAU member since 2019
- **Referee** for publications in the *AJ*, *A&A*, *MNRAS*, *PASP* and *JATIS*.

6 TEACHING & MENTORING

PhD supervising:

- **Lucie Leboulleux**, in co-direction between STScI & ONERA, France (Leboulleux, N'Diaye, Mazoyer et al. 2017 SPIE ; Leboulleux et al. 2018 ; Leboulleux et al. 2018 SPIE).
- **Kevin Fogarty**, PhD at JHU and 1 year postdoc at STScI (Fogarty, Pueyo, Mazoyer et al, 2018 AJ ; Fogarty, Mazoyer et al, 2018 SPIE ; Fogarty, Pueyo, Mazoyer et al, 2017 SPIE). Now Caltech Prize Postdoctoral Fellowship in Experimental Physics or Astrophysics.

Teaching assistant:

Université Paris Diderot – Paris 7	Electronics	**2013 - 2014**
Université Paris Descartes – Paris 5	Fluid dynamics	**2011 - 2012**

La Main à la Pâte: **2007 - 2008**

- I taught science during 8 months (30h/week) in primary schools in underprivileged neighborhoods (Perpignan, France). **La Main à la pâte** was founded by Nobel Prize winner G. Charpak, astronomer P. Léna and physicist Y. Quéré, of the French Academy of Sciences, to improve the quality of science and technology teaching in primary and middle school.

PUBLICATION LIST

1 MAJOR REFEREED PUBLICATIONS

1. **Mazoyer, J.** ; Pueyo, L. ; N'Diaye, M. et al. (**2018**), *Active Correction of Aperture Discontinuities-Optimized Stroke Minimization. II. Optimization for Future Missions*, The Astronomical Journal, 155, 8, DOI Link, 8 citations
2. **Mazoyer, J.** ; Pueyo, L. ; N'Diaye, M. et al. (**2018**), *Active Correction of Aperture Discontinuities-Optimized Stroke Minimization. I. A New Adaptive Interaction Matrix Algorithm*, The Astronomical Journal, 155, 7, DOI Link, 6 citations
3. Fogarty, K. ; Pueyo, L. ; **Mazoyer, J.** et al. (**2017**), *Polynomial Apodizers for Centrally Obscured Vortex Coronagraphs*, The Astronomical Journal, 154, 240, DOI Link, 6 citations
4. **Mazoyer, J.** ; Pueyo, L. ; Norman, C. et al. (**2016**), *Active compensation of aperture discontinuities for WFIRST-AFTA: analytical and numerical comparison of propagation methods and preliminary results with a WFIRST-AFTA-like pupil*, Journal of Astronomical Telescopes, Instruments, and Systems, 2, 011008, DOI Link, 7 citations
5. **Mazoyer, J.** ; Boccaletti, A. ; Choquet, É. et al. (**2016**), *A Symmetric Inner Cavity in the HD 141569A Circumstellar Disk*, The Astrophysical Journal, 818, 150, DOI Link, 10 citations
6. **Mazoyer, J.** ; Boccaletti, A. ; Augereau, J. -C. et al. (**2014**), *Is the HD 15115 inner disk really asymmetrical?*, Astronomy and Astrophysics, 569, A29, DOI Link, 28 citations
7. **Mazoyer, J.** ; Baudoz, P. ; Galicher, R. et al. (**2014**), *High-contrast imaging in polychromatic light with the self-coherent camera*, Astronomy and Astrophysics, 564, L1, DOI Link, 26 citations
8. **Mazoyer, J.** ; Baudoz, P. ; Galicher, R. et al. (**2013**), *Estimation and correction of wavefront aberrations using the self-coherent camera: laboratory results*, Astronomy and Astrophysics, 557, A9, DOI Link, 27 citations

2 OTHER REFEREED PUBLICATIONS

1. Ertel, S. ; Defrère, D. ; Hinz, P. et al. (**2020**), *The HOSTS Survey for Exozodiacal Dust: Observational Results from the Complete Survey*, The Astronomical Journal, 159, 177, DOI Link
2. Bruzzone, J. S. ; Metchev, S. ; Duchêne, G. et al. (**2020**), *Imaging the 44 au Kuiper Belt Analog Debris Ring around HD 141569A with GPI Polarimetry*, The Astronomical Journal, 159, 53, DOI Link
3. Hom, J. ; Patience, J. ; Esposito, T. M. et al. (**2020**), *First Resolved Scattered-light Images of Four Debris Disks in Scorpius-Centaurus with the Gemini Planet Imager*, The Astronomical Journal, 159, 31, DOI Link
4. Bhowmik, T. ; Boccaletti, A. ; Thébault, P. et al. (**2019**), *Spatially resolved spectroscopy of the debris disk HD 32297. Further evidence of small dust grains*, Astronomy and Astrophysics, 630, A85, DOI Link, 7 citations

5. Ren, B. ; Choquet, É. ; Perrin, M. D. et al. (**2019**), *An Exo-Kuiper Belt with an Extended Halo around HD 191089 in Scattered Light*, The Astrophysical Journal, 882, 64, DOI Link, 3 citations
6. Stark, C. C. ; Belikov, R. ; Bolcar, M. R. et al. (**2019**), *ExoEarth yield landscape for future direct imaging space telescopes*, Journal of Astronomical Telescopes, Instruments, and Systems, 5, 024009, DOI Link, 2 citations
7. Engler, N. ; Boccaletti, A. ; Schmid, H. M. et al. (**2019**), *Investigating the presence of two belts in the HD 15115 system*, Astronomy and Astrophysics, 622, A192, DOI Link, 6 citations
8. Esposito, T. M. ; Duchêne, G. ; Kalas, P. et al. (**2018**), *Direct Imaging of the HD 35841 Debris Disk: A Polarized Dust Ring from Gemini Planet Imager and an Outer Halo from HST/STIS*, The Astronomical Journal, 156, 47, DOI Link, 5 citations
9. Leboulleux, L. ; Sauvage, J. -F. ; Pueyo, L. A. et al. (**2018**), *Pair-based Analytical model for Segmented Telescopes Imaging from Space for sensitivity analysis*, Journal of Astronomical Telescopes, Instruments, and Systems, 4, 035002, DOI Link, 2 citations
10. Poteet, C. A. ; Chen, C. H. ; Hines, D. C. et al. (**2018**), *Space-based Coronagraphic Imaging Polarimetry of the TW Hydrae Disk: Shedding New Light on Self-shadowing Effects*, The Astrophysical Journal, 860, 115, DOI Link, 4 citations
11. Jensen-Clem, R. ; Mawet, D. ; Gomez Gonzalez, C. A. et al. (**2018**), *A New Standard for Assessing the Performance of High Contrast Imaging Systems*, The Astronomical Journal, 155, 19, DOI Link, 13 citations
12. Perrot, C. ; Boccaletti, A. ; Pantin, E. et al. (**2016**), *Discovery of concentric broken rings at sub-arcsec separations in the HD 141569A gas-rich, debris disk with VLT/SPHERE*, Astronomy and Astrophysics, 590, L7, DOI Link, 25 citations
13. Delorme, J. R. ; Galicher, R. ; Baudoz, P. et al. (**2016**), *Focal plane wavefront sensor achromatization: The multireference self-coherent camera*, Astronomy and Astrophysics, 588, A136, DOI Link, 10 citations
14. Choquet, É. ; Perrin, M. D. ; Chen, C. H. et al. (**2016**), *First Images of Debris Disks around TWA 7, TWA 25, HD 35650, and HD 377*, The Astrophysical Journal, 817, L2, DOI Link, 44 citations
15. Debes, J. H. ; Ygouf, M. ; Choquet, E. et al. (**2016**), *Wide-Field Infrared Survey Telescope-Astrophysics Focused Telescope Assets coronagraphic operations: lessons learned from the Hubble Space Telescope and the James Webb Space Telescope*, Journal of Astronomical Telescopes, Instruments, and Systems, 2, 011010, DOI Link, 9 citations
16. Wiens, R. C. ; Maurice, S. ; Lasue, J. et al. (**2013**), *Pre-flight calibration and initial data processing for the ChemCam laser-induced breakdown spectroscopy instrument on the Mars Science Laboratory rover*, Spectrochimica Acta, 82, 1, DOI Link, 125 citations
17. Cousin, A. ; Forni, O. ; Maurice, S. et al. (**2011**), *Laser induced breakdown spectroscopy library for the Martian environment*, Spectrochimica Acta, 66, 805, DOI Link, 44 citations

3 PHD THESIS

- **Mazoyer, J.** (**2014**), *High-Contrast Direct Imaging of Exoplanets and Circumstellar Disks: From the Self-Coherent Camera to NICI Data Analysis*, Ph.D. Thesis, DOI Link, 2 citations

4 MAJOR CONFERENCE PROCEEDINGS

1. Fogarty, K. ; **Mazoyer, J.** ; St. Laurent, K. et al. (**2018**), *Optimal deformable mirror and pupil apodization combinations for apodized pupil Lyot coronagraphs with obstructed pupils*, Space Telescopes and Instrumentation 2018: Optical, Infrared, and Millimeter Wave, 10698, 106981J, DOI Link, 1 citation
2. Ruane, G. ; Riggs, A. ; **Mazoyer, J.** et al. (**2018**), *Review of high-contrast imaging systems for current and future ground- and space-based telescopes I: coronagraph design methods and optical performance metrics*, Space Telescopes and Instrumentation 2018: Optical, Infrared, and Millimeter Wave, 10698, 106982S, DOI Link, 2 citations
3. **Mazoyer, J.** ; Pueyo, L. ; N'Diaye, M. et al. (**2017**), *Capabilities of ACAD-OSM, an active method for the correction of aperture discontinuities*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 10400, 104000G, DOI Link, 2 citations
4. **Mazoyer, J.** ; Pueyo, L. (**2017**), *Fundamental limits to high-contrast wavefront control*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 10400, 1040014, DOI Link, 1 citation
5. Leboulleux, L. ; N'Diaye, M. ; **Mazoyer, J.** et al. (**2017**), *Comparison of wavefront control algorithms and first results on the high-contrast imager for complex aperture telescopes (hicat) testbed*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 10562, 105622Z, DOI Link
6. Fogarty, K. ; Pueyo, L. ; **Mazoyer, J.** et al. (**2017**), *Tip/tilt optimizations for polynomial apodized vortex coronagraphs on obscured telescope pupils*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 10400, 104000T, DOI Link, 2 citations
7. **Mazoyer, J.** ; Pueyo, L. ; N'Diaye, M. et al. (**2016**), *Correcting for the effects of pupil discontinuities with the ACAD method*, Space Telescopes and Instrumentation 2016: Optical, Infrared, and Millimeter Wave, 9904, 99044T, DOI Link, 1 citation
8. **Mazoyer, J.** ; Pueyo, L. ; Norman, C. et al. (**2015**), *Active correction of aperture discontinuities (ACAD) for space telescope pupils: a parametic analysis*, Techniques and Instrumentation for Detection of Exoplanets VII, 9605, 96050M, DOI Link, 9 citations
9. N'Diaye, M. ; **Mazoyer, J.** ; Choquet, É. et al. (**2015**), *High-contrast imager for complex aperture telescopes (HiCAT): 3. first lab results with wavefront control*, Techniques and Instrumentation for Detection of Exoplanets VII, 9605, 96050I, DOI Link, 7 citations
10. **Mazoyer, J.** ; Boccaletti, A. ; Augereau, J. -C. et al. (**2014**), *Is the HD 15115 circumstellar disk really asymmetrical?*, Thirty years of Beta Pic and Debris Disks Studies, 47
11. **Mazoyer, J.** ; Galicher, R. ; Baudoz, P. et al. (**2014**), *Deformable mirror interferometric analysis for the direct imagery of exoplanets*, Adaptive Optics Systems IV, 9148, 914846, DOI Link, 1 citation
12. **Mazoyer, J.** ; Baudoz, P. ; Galicher, R. et al. (**2013**), *Direct detection of exoplanets in polychromatic light with a Self-coherent camera*, Proceedings of the Third AO4ELT Conference, 97, DOI Link
13. Baudoz, P. ; **Mazoyer, J.** ; Galicher, R. (**2013**), *Laboratory tests of planet signal extraction in high contrast images*, Proceedings of the Third AO4ELT Conference, 109, DOI Link, 1 citation

14. **Mazoyer, J.** ; Galicher, R. ; Baudoz, P. et al. (**2013**), *Speckle correction in polychromatic light with the self-coherent camera for the direct detection of exoplanets*, Techniques and Instrumentation for Detection of Exoplanets VI, 8864, 88640N, DOI Link, 1 citation
15. Galicher, R. ; **Mazoyer, J.** ; Baudoz, P. et al. (**2013**), *High-contrast imaging with a self-coherent camera*, Techniques and Instrumentation for Detection of Exoplanets VI, 8864, 88640M, DOI Link
16. Baudoz, P. ; **Mazoyer, J.** ; Mas, M. et al. (**2012**), *Dark hole and planet detection: laboratory results using the self-coherent camera*, Ground-based and Airborne Instrumentation for Astronomy IV, 8446, 84468C, DOI Link, 10 citations
17. Mas, M. ; Baudoz, P. ; **Mazoyer, J.** et al. (**2012**), *Experimental results on wavefront correction using the self-coherent camera*, Ground-based and Airborne Instrumentation for Astronomy IV, 8446, 844689, DOI Link, 4 citations
18. **Mazoyer, J.** ; Baudoz, P. ; Mas, M. et al. (**2012**), *Experimental parametric study of the self-coherent camera*, Space Telescopes and Instrumentation 2012: Optical, Infrared, and Millimeter Wave, 8442, 844250, DOI Link, 2 citations
19. Gasnault, O. ; **Mazoyer, J.** ; Cousin, A. et al. (**2012**), *Deciphering Sample and Atmospheric Oxygen Contents with ChemCam on Mars*, Lunar and Planetary Science Conference, 2888, 1 citation

5 OTHER CONFERENCE PROCEEDINGS

1. N'Diaye, M. ; Fogarty, K. ; Soummer, R. et al. (**2018**), *Apodized Pupil Lyot coronagraphs with arbitrary aperture telescopes: novel designs using hybrid focal plane masks*, Space Telescopes and Instrumentation 2018: Optical, Infrared, and Millimeter Wave, 10698, 106986A, DOI Link
2. Soummer, R. ; Brady, G. R. ; Brooks, K. et al. (**2018**), *High-contrast imager for complex aperture telescopes (HiCAT): 5. first results with segmented-aperture coronagraph and wavefront control*, Space Telescopes and Instrumentation 2018: Optical, Infrared, and Millimeter Wave, 10698, 106981O, DOI Link
3. Snik, F. ; Absil, O. ; Baudoz, P. et al. (**2018**), *Review of high-contrast imaging systems for current and future ground-based and space-based telescopes III: technology opportunities and pathways*, Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation III, 10706, 107062L, DOI Link, 2 citations
4. St. Laurent, K. ; Fogarty, K. ; Zimmerman, N. T. et al. (**2018**), *Apodized pupil Lyot coronagraphs designs for future segmented space telescopes*, Space Telescopes and Instrumentation 2018: Optical, Infrared, and Millimeter Wave, 10698, 106982W, DOI Link
5. Jovanovic, N. ; Absil, O. ; Baudoz, P. et al. (**2018**), *Review of high-contrast imaging systems for current and future ground-based and space-based telescopes: Part II. Common path wavefront sensing/control and coherent differential imaging*, Adaptive Optics Systems VI, 10703, 107031U, DOI Link, 4 citations
6. Leboulleux, L. ; Pueyo, L. ; Sauvage, J. -F. et al. (**2018**), *Sensitivity analysis for high-contrast imaging with segmented space telescopes*, Space Telescopes and Instrumentation 2018: Optical, Infrared, and Millimeter Wave, 10698, 106986H, DOI Link

7. Egron, S. ; Soummer, R. ; Lajoie, C. -P. et al. (**2017**), *James Webb Space Telescope optical simulation testbed IV: linear control alignment of the primary segmented mirror*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 10398, 1039811, DOI Link
8. Pueyo, L. ; Zimmerman, N. ; Bolcar, M. et al. (**2017**), *The LUVOIR architecture "A" coronagraph instrument*, Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series, 10398, 103980F, DOI Link, 6 citations
9. Leboulleux, L. ; N'Diaye, M. ; Riggs, A. J. E. et al. (**2016**), *High-contrast imager for Complex Aperture Telescopes (HiCAT). 4. Status and wavefront control development*, Space Telescopes and Instrumentation 2016: Optical, Infrared, and Millimeter Wave, 9904, 99043C, DOI Link
10. Galicher, R. ; Baudoz, P. ; Delorme, J. R. et al. (**2014**), *High contrast imaging on the THD bench: progress and upgrades*, Space Telescopes and Instrumentation 2014: Optical, Infrared, and Millimeter Wave, 9143, 91435A, DOI Link, 1 citation
11. Delorme, J. R. ; Galicher, R. ; Baudoz, P. et al. (**2014**), *High-contrast imaging in wide spectral band with a self-coherent camera and achromatic coronagraphs*, Advances in Optical and Mechanical Technologies for Telescopes and Instrumentation, 9151, 91515Q, DOI Link, 1 citation
12. Galicher, R. ; Delorme, J. R. ; Baudoz, P. et al. (**2013**), *Focal Plane Wavefront Sensing with a self-coherent camera*, Proceedings of the Third AO4ELT Conference, 123, DOI Link

6 WHITE PAPERS (SELECTED)

- Boccaletti, A. ; Chauvin, G. ; Mouillet, D. et al. (**2020**), *SPHERE+: Imaging young Jupiters down to the snowline*, arXiv e-prints, arXiv:2003.05714
- Gaudi, B. S. ; Seager, S. ; Mennesson, B. et al. (**2020**), *The Habitable Exoplanet Observatory (HabEx) Mission Concept Study Final Report*, arXiv e-prints, arXiv:2001.06683
- The LUVOIR Team (**2019**), *The LUVOIR Mission Concept Study Final Report*, arXiv e-prints, arXiv:1912.06219
- **Mazoyer, J.** ; Baudoz, P. ; Belikov, R. et al. (**2019**), *High-Contrast Testbeds for Future Space-Based Direct Imaging Exoplanet Missions*, Bulletin of the American Astronomical Society, 51, 101, arXiv:1907.09508