Publications of the Lyot Project

Refereed Publications

1. "Speckle noise and dynamic range in coronagraphic images", Soummer, R., Ferrari, A., Aime, C., Jolissaint, L., *ApJ*, 669, 642-565, (November 2007)
2. "Fast Computation of Lyot-Style coronagraph propagation", Soummer, R., Pueyo, L., Sivaramakrishnan, A., Vanderbei, R., *Optics Express,* in press (2007)
3. "The Strehl Ratio in Adaptive Optics images: Statistics and Estimation", Soummer, R. Ferrari, A., *ApJL*, 663, 49 (July 2007)
4. "Apodized apertures using a Mach-Zendher interferometer: Laboratory results", Carlotti, A., Ricort, G., Aime, C., El Azhari, Y., Soummer, R. *A&A*, in press (2007)
5. "The Lyot Project: status and results", Sivaramakrishnan, A., Oppenheimer, B. R., Hinkley, S., Brenner, D., Soummer, R., Mey, J. L., Lloyd, J. P., Perrin, M. D., Graham, J. R., Makidon, R. B., Roberts, L. C., Kuhn, J. R., *Comptes Rendus Physique*, Vol. 8, p. 355-364 (April 2007).
6. "Adaptive optics for direct detection of extrasolar planets: the Gemini Planet Imager", Macintosh, B., Graham, J., Palmer, D., Doyon, R., Gavel, D., Larkin, J., Oppenheimer, B., Saddlemyer, L., Wallace, J. K., Bauman, B., Erikson, D., Poyneer, L., Sivaramakrishnan, A., Soummer, R., Veran, J., *Comptes Rendus Physique*, Vol. 8, p. 365-373 (April 2007).
7. "Temporal Evolution of Coronagraphic Dynamic Range and Constraints on Companions to Vega" by S. Hinkley, B. R. Oppenheimer, R. Soummer, A. Sivaramakrishnan, L. C. Roberts, Jr., J. Kuhn, R. B. Makidon, M. D. Perrin, J. P. Lloyd, K. Kratter, D. Brenner, *Astrophysical Journal*, Vol. 654, p. 633-640 (January 2007).
8. "Direct Detection of Exoplanets" by J.-L. Beuzit, D. Mouillet, B. R. Oppenheimer, J. D. Monnier, in *Protostars and Planets V*, B. Reipurth, D. Jewitt, K. Keil, eds. (Tucson: University of Arizona Press), Sec. 7, Chap. 9, p. 129-144 (2007).
9. "The Challenges of Coronagraphic Astrometry" by A. P. Digby, S. Hinkley, B. R. Oppenheimer, A. Sivaramakrishnan, J. P. Lloyd, M. D. Perrin, L. C. Roberts, Jr., R Soummer, D. Brenner, R. B. Makidon, M. Shara, J. Kuhn, J. Graham, P. Kalas, L. Newburgh, *Astrophysical Journal*, Vol. 650, p. 484-496 (October 2006).
10. "Astrometry and Photometry with Coronagraphs" by A. Sivaramakrishnan and B. R. Oppenheimer, *Astrophysical Journal*, Vol. 647, p. 620-629 (August 2006).
11. "Low-Order Aberrations in Band-Limited Lyot Coronagraphs" by A. Sivaramakrishnan, R. Soummer, A. V. Sivaramakrishnan, J. P. Lloyd, B. R. Oppenheimer, R. B. Makidon, *Astrophysical Journal*, Vol. 634, p. 1416-1422 (December 2005).
12. "Adaptive Optics Photometry and Astrometry of Binary Stars" by L. C. Roberts, Jr., N. H. Turner, L. W. Bradford, T. A. ten Brummelaar, B. R. Oppenheimer, J. R. Kuhn, K. Whitman, M. D. Perrin, J. R. Graham, *Astronomical Journal*, Vol. 130, p. 2262-2271 (November 2005).
13. "An Analysis of Fundamental Waffle Mode in Early AEOS Adaptive Optics Images" by R.B. Makidon, A. Sivaramakrishnan, M.D. Perrin, L.C. Roberts, Jr., R. Soummer, B.R. Oppenheimer, and J.R. Graham, *Publications of the Astronomical Society of the Pacific*, Vol. 117, p. 831-846 (August 2005).
14. "Tip Tilt Error in Lyot Coronagraphy," Lloyd, J. P., and Sivaramakrishnan, A., *Astron. J.*, 621, pp 1153-1158 (March 2005)

15. "Apodized Pupil Lyot Coronagraphs for Arbitrary Telescope Apertures," Soummer, R., *Astrophys. J. Lett.*, 618, L161 (January 2005)
16. "Polarization Effects in Reflecting Coronagraphs for White Light Applications in Astronomy" by J. B. Breckinridge and B. R. Oppenheimer, *The Astrophysical Journal*, Vol. 600, p. 1091-1098 (January 2004).
17. "The Structure of High Strehl Ratio Point-Spread Functions," Perrin, M. D., et al., *Astrophys. J.*, 596, 702 (October 2003)
18. "Speckle Decorrelation and Dynamic Range in Speckle Noise-Limited Imaging," Sivaramakrishnan, A., et al., *Astrophys. J. L.*, Vol. 581, L59 (December 2002)
19. "Imaging Exoplanets: The Role of Small Telescopes," Oppenheimer, B. R., Sivaramakrishnan, A., and Makidon, R. B.,*The Future of Small Telescopes*, Terry Oswalt, ed. (Dordrecht, The Netherlands: Kluwer Academic Publishers), III, 295 (2002)

Four to-be-refereed publications are in preparation as of December 2007, with two submitted and under review.

SPIE Papers

1. "MEMS-based extreme adaptive optics for planet detection" by Bruce Macintosh, James Graham, Ben R. Oppenheimer, Lisa Poyneer, Anand Sivaramakrishnan, Jean-Pierre Veran, in *MEMS/MOEMS Components and their Applications III*, S. S. Olivier, S. A. Tadigadapa, A. K. Henning (editors), *Proceedings of the SPIE*, Vol. 6113, pp. 48-57 (July 2006).
2. "The Lyot Project: Toward Exoplanet and Circumstellar disk Imaging and Spectroscopy," Oppenheimer, B. R., et al., *Proc. SPIE*, 5490, 433 (2004)
3. "Waffle Mode Error in the AEOS Adaptive Optics Point Spread Function," Makidon, R. B., et al., *Proc. SPIE*, 4860, 315 (2003)
4. "Astronomical Coronagraphy with High-Order Adaptive Optics Systems," Lloyd, J. P., et al., *Proc. SPIE*, 4490, 290 (2001)

Conference Proceedings

1. "Lyot Project Survey Analysis" by J. Leconte, R. Soummer, B. R. Oppenheimer, S. Hinkley, D. Brenner, A. Sivaramakrishnan, J. Kuhn, M. D. Perrin, L. C. Roberts, Jr., M. Simon, R. A. Brown, G. Chabrier, I. Baraffe, in *In the Spirit of Bernard Lyot: The Direct Detection of Planets and Circumstellar Disks in the 21st Century*, P. Kalas, ed. (Berkeley: University of California Press), (June 2007).
2. "Searching for Planets Orbiting Distant Suns: Why Would You Look Through a Microscope?" by Mey, J. L., Oppenheimer, B. R., Soummer, R., Sivaramakrishnan, A., *Microscopy and Microanalysis*, Proceedings Vol. 12, Nr. 708 (2006).
3. "The Lyot Project: Understanding the AEOS Adaptive Optics PSF" by R. B. Makidon, A. Sivaramakrishnan, R. Soummer, B. R. Oppenheimer, L. C. Roberts, J. R. Graham, M. D. Perrin, in *Direct Imaging of Exoplanets: Science and Techniques*, C. Aime, F. Vakili (editors), *Proceedings of the IAU*, Colloquium Vol. 200, pp. 603-606 (October 2006).
4. "Scintillation and Pupil Illumination in AO Coronagraphy" by A. Sivaramakrishnan, B. R. Oppenheimer, M. D. Perrin, L. C. Roberts, R. B. Makidon, R. Soummer, A. P. Digby, L. W. Bradford, M. A. Skinner, N. H. Turner, T. A. ten Brummelaar, in *Direct Imaging of Exoplanets: Science and Techniques*, C. Aime, F. Vakili (editors), *Proceedings of the IAU*, Colloquium Vol. 200, pp. 613-616 (October 2006).

5. "Speckle Statistics in Direct and Coronagraphic Imaging" by R. Soummer, C. Aime, A. Ferrari, A. Sivaramakrishnan, L. Jolissaint, J. Lloyd, B. R. Oppenheimer, R. B. Makidon, M. Carbillet, in *Direct Imaging of Exoplanets: Science and Techniques*, C. Aime, F. Vakili (editors), *Proceedings of the IAU*, Colloquium Vol. 200, pp. 581-586 (October 2006).
6. "Apodized Pupil Lyot Coronagraphs: Concepts and Application to the Gemini Planet Imager" by R. Soummer, C. Aime, A. Ferrari, A. Sivaramakrishnan, B. R. Oppenheimer, R. B. Makidon, B. Macintosh, in *Direct Imaging of Exoplanets: Science and Techniques*, C. Aime, F. Vakili (editors), *Proceedings of the IAU*, Colloquium Vol. 200, pp. 367-372 (October 2006).
7. "The Lyot Project Coronagraph: Data Processing and Performance Analysis" by R. Soummer, B. R. Oppenheimer, S. Hinkley, A. Sivaramakrishnan, R. B. Makidon, A. Digby, D. Brenner, J. Kuhn, M. D. Perrin, L. C. Roberts, Jr., K. Kratter, in *Astronomy with High Contrast Imaging*, C. Aime, ed. (Nice: EAS Publications), Vol. 204, p. 201-215 (April 2006).
8. "Improving Wave Front Residuals for Near-Infrared Coronagraphy with AEOS" by R. B. Makidon, A. Sivaramakrishnan, R. Soummer, B. R. Oppenheimer, L. C. Roberts, Jr., J. R. Graham, M. D. Perrin, in *2005 AMOS Technical Conference,* P. W. Kervin, J. L. Africano, eds. (Hawaii: Maui Economic Development Board Publications), p. 585-599 (December 2005).
9. "Scintillation in high dynamic range coronagraphy," by Oppenheimer, B. R., et al. 2005, in *2005 AMOS Technical Conference,* P. W. Kervin, J. L. Africano, eds. (Hawaii: Maui Economic Development Board Publications), p. 316-331 (December 2005).
10. "Performance Predictions of Second Stage Adaptive Optics Coronagraphy on the AEOS Telescope," Sivaramakrishnan, A., et al., *2004 AMOS Technical Conference*, P. W. Kervin, J. L. Africano, eds. (USAF Publications; March 2004), 490
11. "Extremely High Fidelity Imaging with AEOS and the Lyot Project Coronagraph," Oppenheimer, B. R., et al., *2004 AMOS Technical Conference*, P. W. Kervin, J. L. Africano, eds. (USAF Publications; March 2004), 498
12. "The Lyot Project: Toward Exoplanet Images and Spectroscopy," Digby, A. P., et al., *8th International Conference on Bioastronomy: Habitable Worlds*, Rekyavik (2004)
13. "The Lyot Project: Toward Exoplanet Images and Spectra," Oppenheimer, B. R., et al., *Terrestrial Planet Finder Technical Conference and Exposition*, C. Lindensmith, ed. (NASA/JPL Publications; March 2004)
14. "The Lyot Project: Toward Exoplanet and Circumstellar disk Imaging and Spectroscopy," Oppenheimer, B. R., et al., *Bulletin of the AAS*, **36**, 1090 (December 2003)
15. "First Light for Kermit," Perrin, M., et al., *2003 AMOS Technical Conference*, P. W. Kervin, J. L. Africano, eds. (USAF Publications; March 2003), 422
16. "The Lyot Project: Status and Deployment Plans," Oppenheimer, B. R., et al., *2003 AMOS Technical Conference*, P. W. Kervin, J. L. Africano, eds. (USAF Publications; March 2003), 354
17. "The Lyot Project: Towards Exoplanet Images and Spectroscopy," Lloyd, J. P., et al., *Proc. Towards Other Earths: DARWIN/TPF and the Search for Extra-solar Terrestrial Planets*, 513 (2003)
18. "Near Infrared Coronagraph Optimized for the AEOS Telescope," Oppenheimer, B. R., et al., *2002 AMOS Technical Conference*, P. W. Kervin, J. L. Africano, eds. (USAF Publications; March 2002), 491

19. “Waffle Mode Error in the AEOS Adaptive Optics Point Spread Function,” Makidon, R. B., et al., *2002 AMOS Technical Conference*, P. W. Kervin, J. L. Africano, eds. (USAF Publications; March 2002), 571
20. “Coronagraphy with the AEOS High Order Adaptive Optics System,” Lloyd, J. P., et al. *Bulletin of the AAS*, **33**, 902 (May 2001)
21. “Limits of Lyot Coronagraphy with AEOS Adaptive Optics Telescope,” Sivaramakrishnan, A., et al., *Bulletin of the AAS*, **33**, 902 (May 2001)
22. “Astronomical Coronagraphy with High Order Adaptive Optics,” Lloyd, J. P., et al., *2001 AMOS Technical Conference*, P. W. Kervin, J. L. Africano, eds. (USAF Publications; March 2001), 584