

BETH A. BILLER

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EDUCATION

The University of Arizona

Ph.D., August 2007, Astronomy

Thesis: “A High Contrast Survey for Extrasolar Giant Planets with the Simultaneous Differential Imager (SDI)”

Advisor: Professor Laird Close

M.S., May 2005, Astronomy

Swarthmore College

B.A., May 2000, with Honors, Astrophysics

RESEARCH INTERESTS

Direct detection of extrasolar planets;
Properties of brown dwarfs and extrasolar planets;
Star and planet formation;
Adaptive Optics;
High Contrast Imaging;
Evolved Stars;

FELLOWSHIPS & AWARDS

2007	Hubble Postdoctoral Fellowship
2007	NSF Postdoctoral Fellowship (declined)
2007	Galileo Circle Scholarship
2007	Michelson Postdoctoral Fellowship (declined)
2004-present	NASA Graduate Student Research Program Fellowship
2002-2004	University of Arizona Graduate Research Fellowship
2002	Departmental Research Award (\$2500)

RESEARCH

A Survey of the Closest, Youngest Stars with SDI at the VLT and MMT, Graduate Student (Aug. 2002—)

Developed complex pipeline to reduce SDI data. Analyzed and interpreted SDI data for ~ 50 young, nearby stars. Collaborators: L. Close, R. Lenzen, W. Brandner, E. Masciadri, D. McCarthy, T. Henning, E. Nielsen, S. Kellner, and M. Hartung (U of A, MPIA-Heidelberg, ESO)

Direct Distance Determination for the Planetary Mass Object 2MASS 1207b, Graduate Student (Dec. 2005—)

Proposed for and acquired 6 epochs of parallax data with the SMARTS 1.3 m for the 2MASS 1207 system (M8 brown dwarf with a $\sim L3$ - $L5$ planetary mass companion). Attained astrometric accuracy of ~ 10 mas – proving the ability to measure the trigonometric parallax of 2MASS 1207 at distances > 50 pc. Have proposed for final 7 epochs of data in the 2007A semester to complete this project. Collaborators: L. Close (U of A)

Differential Imaging Experiment for the High Contrast Interferometry Testbed, Graduate Student (May. 2004—)

Designed, implemented, and analyzed data from next-generation SDI experiment for the High Contrast Interferometry Testbed at JPL. Collaborators: K. Stapelfeldt, J. Trauger, L. Close (JPL and U of A)

AO Mid-IR Studies of AGB, post-AGB, and Symbiotic Stars, Graduate Student (May 2003 – Apr 2006)

First AO imaging in the Mid-IR. Resolved small ($0.16''$) disk around the AGB star RV Boo and $0.7''$ jets around the symbiotic star CH Cyg. Collaborators: L. Close, P. Hinz, J. Biegging, W. Hoffmann, D. Miller, G. Brusa, M. Kenworthy, R. Angel, A. Li, M. Marengo (U of A, U of Missouri, CfA)

X-Ray Imaging of Hot Gas in NGC 4472, Data Specialist, Chandra X-ray Center (Aug. 2001 – May. 2004)

Analyzed Chandra images of NGC 4472. Collaborators: C. Jones, W. Forman (CfA)

OBSERVING EXPERIENCE

VLT 8m	NACO near-IR camera with the SDI device (15 nights)
MMT 6.5m	ARIES near-IR camera with the SDI device (5 nights)
MMT 6.5m	MIRAC mid-IR camera (2 nights)
SMARTS 1.3m	ANDICAM VIS/IR dual imager (18 nights)

GRADUATE COURSES

Adaptive Optics
Astrobiology
Astronomical Instrumentation and Techniques
Astronomy Education and Public Outreach
Atomic and Molecular Astrophysics
Extragalactic Astronomy and Cosmology
General Relativity and Cosmology
High Energy Astrophysics
Interstellar Medium and Star Formation
Optical Design and Instrumentation I
Radio Astronomy
Stellar Atmospheres
Stellar Structure
Structure and Dynamics of Galaxies

CONFERENCES AND WORKSHOPS

2007 In the Spirit of Lyot - Berkeley
2006 Cool Stars 14 - Pasadena
2006 SPIE Astronomical Telescopes - Orlando
2005 Protostars and Planets V - Waikoloa, HI
2005 IAUC 200 - Direct Detection of Exoplanets - Villefranche-sur-Mer, France
2005 Center for Adaptive Optics Summer School - Santa Cruz
2005 Aspen Winter Conference - Planet Formation and Detection - Aspen
2004 Michelson Summer School - High Contrast Imaging - Pasadena
2004 SPIE Astronomical Telescopes - Glasgow
2003 Asymmetric Planetary Nebulae III - Mt. Rainier, WA
2002 Winter Meeting, American Astronomical Society - Washington, DC
2001 Two Years of Science with Chandra - Washington, DC
2001 X-Ray Astronomy School - Goddard Space Flight Center
2000 Winter Meeting, American Astronomical Society - Atlanta
1999 Winter Meeting, American Astronomical Society - Austin

INVITED TALKS

December 2004 Talk for HCIT group, JPL
 December 2005 JPL science lunch talk

PROFESSIONAL SERVICE AND OUTREACH

Astronomy Mentor Project Astro Tucson, 2006 –
 Member Graduate Admissions Committee, Steward Obs., 2006
 Coordinator Prospective Graduate Student Visits Committee, Steward Obs., 2006
 Chairwoman Women’s Science Forum, Steward Obs., 2006
 Organizer New grad student welcoming lunch, Steward Obs., 2005
 Volunteer Science Night, Hohokam Middle School, 2003
 Astronomy Mentor Project Astro Boston, 2001–2002
 Mentor TERC Eyes to the Future 2001–2002
 Astronomer Open Observatory Night, Maria Mitchell Observatory, 1999

REFEREED PUBLICATIONS

11. **Biller, B.A.**, Close, L.M., Masciadri, E., Lenzen, R., Brandner, W., McCarthy, D., Henning, T., Nielsen, E., and Hartung, M. 2007, ApJS, in press
A Survey of the Closest, Youngest Stars with SDI at the VLT and MMT.
10. **Biller, B.A.**, Close, L.M., Li, A., Biegging, J.H., Hinz, P.M., Hoffmann, W.F., Marengo, M., Brusa, G., and Miller, D. 2006, ApJ, 647, 464
Resolving the Dusty Circumstellar Structure of the Enigmatic Symbiotic Star CH Cygni with the MMT Adaptive Optics System
9. **Biller, B.A.**, Kasper, M., Close, L.M., Brandner, W., and Kellner, S. 2006, ApJ, 641, L141
Discovery of a Brown Dwarf Very Close to the Sun: A Methane-rich Brown Dwarf Companion to the Low-Mass Star SCR 1845-6357
8. Smith, R.K., Edgar, R.J., Plucinsky, P.P., Wargelin, B.J., Freeman, P.E., and **Biller, B.A.** 2005, ApJ, 623 225.
Chandra Observations of MBM 12 and Models of the Local Bubble
7. **Biller, B. A.**, Close, L. M., Li, A., Biegging, J. H., Hoffmann, W. F., Hinz, P. M., Miller, D., Brusa, G., Lloyd-Hart, M., Wildi, F., Potter, D., and Oppenheimer, B. D. 2005, ApJ, 620, 450
High-Resolution Mid-Infrared Imaging of the Asymptotic Giant Branch Star RV Bootis with the Steward Observatory Adaptive Optics System
6. Close, L.M., Lenzen, R., Guirado, J.C., Nielsen, E.L., Mamajek, E.E., Brandner, W.,

- Hartung, M., Lidman, C., and **Biller, B.A.** 2005, *Nature*, 433, 286
A dynamical calibration of the mass-luminosity relation at very low stellar masses and young ages
5. **Biller, B. A.**, Jones, C., Forman, W. R., Kraft, R., and Ensslin, T. 2004, *ApJ*, 613, 238
Hot Gas Structure in the Elliptical Galaxy NGC 4472
 4. McCaughrean, M.J., Close, L.M., Scholz, R.-D., Lenzen, R., **Biller, B.A.**, Brandner, W., Hartung, M., and Lodieu, N. 2004, *A&A*, 413, 1029
Eps Indi Ba, Bb: The nearest binary brown dwarf
 3. Close, L.M., **Biller, B.A.**, Hoffmann, W.F., Hinz, P.M., Biegling, J.H., Wildi, F., Lloyd-Hart, M., Brusa, G., Fisher, D., Miller, D., and Angel, R. 2003, *ApJ*, 598
Mid-Infrared Imaging of the Post-Asymptotic Giant Branch Star AC Herculis with the Multiple Mirror Telescope Adaptive Optics System
 2. Close, L.M., Siegler, N., Freed, M., and **Biller, B.A.** 2003, *ApJ*, 587, 407
Detection of Nine M8.0-L0.5 Binaries: The Very Low Mass Binary Population and Its Implications for Brown Dwarf and Very Low Mass Star Formation.
 1. Markevitch, M., Bautz, M.W., **Biller, B.A.**, Butt, Y., Edgar, R., Gaetz, T., Garmier, G., Grant, C.E., Green, P., Juda, M., et al. 2003, *ApJ*, 583, 70
Chandra Spectra of the Soft X-Ray Diffuse Background

NON-REFEREED PUBLICATIONS

- Biller, B.A.**, Close, L.M., Masciadri, E., Lenzen, R., Brandner, W., McCarthy, D.W., Henning, T., Nielsen, E., Hartung, M., Kellner, S., Geissler, K., and Kasper, M. 2006, *Proc. SPIE*, 6272, 74
Contrast Limits with the Simultaneous Differential Extrasolar Planet Imager (SDI) at the VLT and MMT
- Biller, B.A.**, Close, L.M., Lenzen, R., Brandner, W., McCarthy, D.W., Masciadri, E., Henning, T., Nielsen, E., and Hartung, M. 2006, *Proceedings of Protostars and Planets V*, pp. 8429
A Survey of the Closest, Youngest Stars with the Simultaneous Differential Extrasolar Planet Imager (SDI) at the VLT and MMT
- Biller, B.A.**, Close, L.M., Masciadri, E., Lenzen, R., Brandner, W., McCarthy, D.W., Henning, T., Nielsen, E., and Hartung, M. 2006, in *Direct Imaging of Exoplanets: Science and Techniques*, *Proceedings of the IAU Colloquium 200*, Edited by C. Aime

and F. Vakili, pp. 53 – 60

A Survey of Close, Young Stars with SDI at the VLT and MMT

Biller, B.A., Close, L.M., Masciadri, E., Lenzen, R., Brandner, W., McCarthy, D.W., Henning, T., Nielsen, E., and Hartung, M. 2006, in *Direct Imaging of Exoplanets: Science and Techniques*, Proceedings of the IAU Colloquium 200, Edited by C. Aime and F. Vakili, pp. 571 – 576

Suppressing speckle noise for simultaneous differential extrasolar planet imaging (SDI) at the VLT and MMT

Biller, B.A., Close, L., Lenzen, R., Brandner, W., McCarthy, D.W., Nielsen, E., and Hartung, M. 2004, Proc. SPIE, 5490, 389

Suppressing speckle noise for simultaneous differential extrasolar planet imaging (SDI) at the VLT and MMT

Lenzen, R., Close, L., Brandner, W., **Biller, B.A.**, and Hartung, M. 2004, Proc. SPIE, 5492, 970

A novel simultaneous differential imager for the direct imaging of giant planets

Zhao, P., Jerius, D.H., Edgar, R.J., Gaetz, T.J., Van Speybroeck, L.P., **Biller, B.A.**, Beckerman, E., and Marshall, H.L. 2004, Proc. SPIE, 5165, 482

Chandra X-ray Observatory Mirror Effective Area

Biller, B. A., Close, L. M., Potter, D., Biegging, J. H., Hoffmann, W., Hinz, P., and Oppenheimer, B. D. 2004, Proceedings of the Asymmetrical Planetary Nebulae III conference, pg. 82

The First Adaptive Optics High Resolution Mid-IR Imaging of Evolved Stars: Case Studies of RV Boo and AC Her

Megeath, S. T., **Biller, B.A.**, Dame, T. M., Leass, E. L., Whitaker, R., and Wilson, T. L. 2003, Proceedings of the Winds, Bubbles, and Explosions conference, pg. 151

Observational Evidence for Triggered Star Formation on Scales of 1 to 300 pc

Megeath, S. T., **Biller, B.A.**, Dame, T. M., Leass, E. L., Whitaker, R., and Wilson, T. L. 2002, Proceedings of the Hot Star Workshop III: The Earliest Stages of Massive Star Birth, pg. 257

The Impact of Massive Stars on the Formation of Young Stellar Clusters

Biller, B.A., Jones, C., and Forman, W. 2001, Bulletin of the American Astronomical Society, 33, 1339

Nuclear Outbursts in the Elliptical Galaxy NGC 4472

- Jensen, E.L.N., **Biller, B.A.**, Koerner, D.W., Whitaker, R.S., Bonaventura, N.R., and Dullighan, A. 2001, Bulletin of the American Astronomical Society, 33, 1308
A Systematic Survey for Nearby Young Stars
- Biller, B.A.** and Plucinsky, P. 2001, Two Years of Science with Chandra Symposium
Using Chandra Event Histogram Data to Characterize the High-Energy Particle Background
- Edgar, R.J., Smith, R., Plucinsky, P., and **Biller, B.A.** 2001, Two Years of Science with Chandra Symposium
X-rays from the Local Bubble with Chandra: Observations of MBM 12
- Biller, B.A.** and Strelitski, V.S. 1999, Bulletin of the American Astronomical Society, 31, 1558
On the Problem of Linewidths in Strong Water Vapor Masers
- Haythe, L., Samus, N.N., **Biller, B.A.**, Hornstein, S., Jisonna, L.J. Jr., and Lu, E. 1999, Bulletin of the American Astronomical Society, 31, 1480
Lost Variables on Nantucket Plates
- Biller, B.A.** and Helfer, T.T. 1998, Bulletin of the American Astronomical Society, 30, 1356
The Density and Structure of CS Emission in the Milky Way Plane

REFERENCES

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