

KENNETH WOOD

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RESEARCH INTERESTS

Star and Planet Formation: Testing theoretical models for the structure and evolution of collapsing protostellar clouds. Modeling the size, structure, and composition of protoplanetary accretion disks. Observational signatures of star and planet formation.

Interstellar Medium: Modeling the three dimensional ionization and temperature structure of the ISM. Effect of 3D structures on the propagation of ionizing radiation and interpretation of nebular emission line diagnostics.

Medical Physics: Optical scattering properties of healthy and diseased tissue. Exploring light scattering spectroscopy for minimal invasive diagnosis of cervical cancer.

Theoretical Radiation Transfer: Development of three dimensional Monte Carlo radiation transfer techniques for scattered light, dust radiative equilibrium, photoionization.

EDUCATION

1993 Ph.D., Astronomy, University of Glasgow
Spectropolarimetric Analysis of Stellar Winds, Advisor: J.C. Brown
1990 B.Sc., Physics & Astronomy, University of Glasgow

EMPLOYMENT

2006- Lecturer in Astronomy, University of St Andrews
2001-2006 PPARC Advanced Fellow, University of St Andrews
1997-2001 Astrophysicist, Harvard-Smithsonian Center for Astrophysics
1996-1997 Assistant Scientist, University of Wisconsin-Madison
1994-1996 UK PPARC/NATO Post Doctoral Research Fellow, University of Wisconsin

PHD STUDENTS

Completed:

Christina Walker, *Modelling the Structure and Appearance of Protoplanetary Disks*, 2006

Mark O'Sullivan, *Warping, Dust Settling, and Dynamics of Protoplanetary Disks*, 2006

Ben Hood, *Theoretical Studies of Scattered Light Signatures of Extrasolar Planets*, 2006

Current:

Thomas Robitaille, *Star Formation and Feedback Processes in the ISM*, 2008

Katharine Johnston, *Observational Signatures of Massive Star Formation*, 2009

NEW LINKS

A program to bring inner city and minority youth from all over the world to St Andrews for golfing, educational, and cultural exchanges. Further information at: www.newlinks.org.

RESEARCH AWARDS AND FUNDING

- 2004-2005 MRC Discipline Hopper, £55K
Light Scattering Spectroscopy for Non-Invasive Diagnosis of Cervical Neoplasia
- 2001-2006 PPARC Advanced Fellow, University of St Andrews
Probing Asymmetries in Astrophysical Environments: Winds, Disks, and Things that Go Clump in the Light
- 2002-2005 PPARC Short Term Visiting Fellowships at St Andrews, £15K
- 1996-2001 NASA Long Term Space Astrophysics Research Program, \$400K
Three Dimensional Radiation Transfer Modeling of Circumstellar Environments
- 1999-2002 Co-I, NSF Stellar Astronomy Program, \$60K
The Geometry and Evolution of Low Mass Star Formation
- 1999 Co-I, Hubble Space Telescope Archival Program, \$30K
Testing Protostellar Collapse and Outflow Models
- 1997 PI, Hubble Space Telescope Archival Program, \$24K
Morphology of Protostellar Environments
- 1994-1996 UK PPARC/NATO Post Doctoral Research Fellowship
Probing Circumstellar Environments with Spectropolarimetry

TALKS AT NATIONAL MEETINGS

- Clues to Disk Clearing from Spectral Energy Distributions*
The Disk-Planet Connection, Cambridge, July 2006
Protoplanetary Disks: Geometry, Variability, Grain Growth, & Evolution
UK National Astronomy Meeting, Bristol, 2002
Interstellar Medium Radiation Transfer Models
UK National Astronomy Meeting, Bristol, 2002

TALKS AT INTERNATIONAL MEETINGS

- Photoionization and Radiation in a Fractal Interstellar Medium*
Small Ionized and Neutral Structures in the ISM, Socorro, May 2006
Monte Carlo Radiation Transfer in Protoplanetary Disks
From Disks to Planets, Pasadena, March 2005
A Review of Photoionization Models of the Diffuse Ionized Gas
Diffuse Matter in the Galaxy, Puerto Rico, September 2004
Monte Carlo Radiation Transfer in Protoplanetary Disks
Cores, Disks, & Outflows, Banff, July 2004
Monte Carlo Photoionization Simulations of Diffuse Ionized Gas
Extraplanar Gas, Dwingeloo, Netherlands, June 2004
Monte Carlo Radiation Transfer in Protoplanetary Disks: Disk-Planet Interactions, Structure and Warping
Structure, Chemistry and Appearance of Protoplanetary Disks, Munich, April 2004
Leaky HII Regions and the He⁺/H⁺ Problem
How the Galaxy Works, Granada, Spain, July 2003

NATIONAL SEMINARS & COLLOQUIA

- Cardiff University, 2003
University of Leeds, 2003
University College London, 2002
Cambridge University, 2002
St Andrews, 2002

Hertfordshire, 2002
Imperial College, 2001

INTERNATIONAL SEMINARS & COLLOQUIA

University of Wisconsin, Madison, 1992, 1995, 1998, 1999, 2003, 2004
Harvard-Smithsonian Center for Astrophysics, 1996, 1997, 2001, 2003
University of California, Berkeley, 2001
NRAO, Green Bank, 1999
University of North Carolina, Charlotte, 1999
Cardelli Memorial Lecture, Villanova University, 1998
California Institute of Technology, 1997
University of Toledo, 1997
University of Minnesota, 1996
University of Montreal, 1992

PUBLICITY

A Planet Nobody Sees, in The Toledo Blade, 25 August 2003
Portrait of an Infant Solar System, Astronomy Picture of the Day, 7 June 2002
Infrared Images of an Infant Solar System, ESO Press Release, 7 May 2002

COMMUNITY SERVICE

PhD Examiner, Cardiff (2003), St Andrews (2004, 2006), Cambridge (2004)
Reviewer of PPARC grants and observing proposals
Reviewer for NASA Origins of Solar Systems program, 1998, 1997
Reviewer, NASA Theory Panel, 1996
Referee typically three papers per year for astronomical journals (ApJ, A&A, MNRAS)

RECENT RESEARCH VISITORS

Greg Madsen (AAO) March 2005
Ron Reynolds (Wisconsin) April 2004
Torsten Elwert (Bochum) January 2004
Regina Schulte-Ladbeck (Pittsburgh) August 2003
John Mathis (Wisconsin) March 2003
Barbara Ercolano (UCL) November 2002
Barbara Whitney, Ed Churchwell (Wisconsin) September 2002
Matthew Bate, Tim Harries (Exeter) September 2002
Jon Bjorkman, Karen Bjorkman (Ohio) July 2001
Belinda Wilkes, Mike Garcia (Harvard) August 2001

CURRENT COLLABORATORS

Ken Rice (Edinburgh)
Moira Jardine, Gaitie Hussain, Andrew Collier Cameron (St Andrews)
Barbara Whitney, John Mathis, Ed Churchwell, Ron Reynolds, Matt Haffner (Wisconsin)
Jon Bjorkman, Karen Bjorkman (Toledo)
Remy Indebetouw, Kelsey Johnson (Virginia)
Ray Jayawardhana, Aleks Scholz (Toronto)
Richard Rand (New Mexico)
Lynn Matthews (Harvard)

REFEREED PUBLICATIONS

2007

A GLIMPSE of a Massive Circumstellar Disk?

Wood, K., Walker, C.H., Whitney, B.A., et al.
2007, in preparation

Hydrostatic Models of Protoplanetary Disks

Walker, C.H., **Wood, K.**, Whitney, B.A., & Bjorkman, J.E.
2007, in preparation

The Effects of Clumping and Interstellar Dust in H II Regions

Mathis, J.S., & **Wood, K.**
2006, MNRAS, submitted

2006

Dust Filtration at Gap Edges: Implications for Spectral Energy Distributions of Discs with Embedded Planets

Rice, W.K.M.R., Armitage, P.J., **Wood, K.**, & Lodato, G.
2006, MNRAS, in press

Interpreting Spectral Energy Distributions from Young Stellar Objects. I. A grid of 200,000 YSO model SEDs

Robitaille, T., Whitney, B.A., Indebetouw, R., **Wood, K.**, & Denzmore, P.
2006, ApJ, in press

Near-Infrared Synthetic Images of Protostellar Disks and Envelopes

Stark, D.P., Whitney, B.A., Stassun, K., & **Wood, K.**
2006, ApJ, 649, 900

Exploring Brown Dwarf Disks: A 1.3 mm Survey in Taurus

Scholz, A., Jayawardhana, R., & **Wood, K.**
2006, ApJ, 645, 1498

X-Ray Emission from T Tauri Stars

Jardine, M., Collier Cameron, A., Donati, J.-F., Gregory, S.G., & **Wood, K.**
2006, MNRAS, 367, 917

Observations of IC348: The Disk Population at 2-3 Million Years

Lada, C.J., Muench, A.A., Luhman, K.L., Allen, L., Hartmann, L., Megeath, T., Myers, P., Fazio, G., **Wood, K.**, Muzerolle, J., Reike, G., Siegler, N., & Young, E.
2006, AJ, 131, 1574

Observational Properties of Protoplanetary Disk Gaps

Varnière, P., Bjorkman, J. E., Frank, A., Quillen, A., Carciofi, A.C. Whitney, B.A., & **Wood, K.**
2006, ApJ, 637, L125

Observations on the Formation of Massive Stars by Accretion

Keto, E., & **Wood, K.**

2006, ApJ, 637, 850

3-D Models of Embedded High-Mass Stars: Effects of a Clumpy Circumstellar Medium

Indebetouw, R., Whitney, B.A., Johnson, K.E., & **Wood, K.**

2006, ApJ, 636, 362

2005

Estimating the Porosity of the Interstellar Medium from Three Dimensional Photoionization Modeling of H II Regions

Wood, K., Haffner, L.M., Reynolds, R.J., Mathis, J.S., & Madsen, G.

2005, ApJ, 633, 295

Disks and Planets around Massive White Dwarfs

Livio, M., Pringle, J., & **Wood, K.**

2005, ApJ, 632, L37

The Effects of Clumping on Derived Abundances in H II Regions

Mathis, J.S., & **Wood, K.**

2005, MNRAS, 360, 227

Modeling the Photopolarimetric Variability of AA Tau

O'Sullivan, M., Truss, M., Walker, C., **Wood, K.**, Matthews, O., Whitney, B., & Bjorkman, J.E.

2005, MNRAS, 358, 632

Observations and Modeling of the Inner Disk Region of T Tauri Stars

Akeson, R.L., Walker, C.H., **Wood, K.**, Eisner, J.A., Scire, E., Penprase, B., Ciardi, D.R., van Belle, G.T., Whitney, B., & Bjorkman, J.E.

2005, ApJ, 622, 440

2004

2-D Models of Protostars: III. Effects of Stellar Temperature

Whitney, B.A., Indebetouw, R., Bjorkman, J.E., & **Wood, K.**

2004, ApJ, 617, 1177

The Changing Corona of LQ Hya

McIvor, T., Jardine, M., Collier Cameron, A., **Wood, K.**, & Donati, J.F.

2004, MNRAS, 355, 1066

The Structure of Brown Dwarf Circumstellar Disks,

Walker, C.H., **Wood, K.**, Lada, C.J., Robitaille, T., Bjorkman, J.E., & Whitney, B.A.,

2004, MNRAS, 351, 607

Monte Carlo Photoionization Simulations of Diffuse Ionized Gas,

Wood, K., & Mathis, J.S.,
2004, MNRAS, 353, 1126

A 3D Monte Carlo Photoionization Code for Modeling Diffuse Ionized Gas,
Wood, K., Mathis, J.S., & Ercolano, B.,
2004, MNRAS, 348, 1337

A Disk Shadow Around the Young Star ASR 41 in NGC 1333,
Hodapp, K.W., Walker, C.H., Reipurth, B., **Wood, K.**, Bally, J., Whitney, B.A., & Connelley,
M.,
2004, ApJ, 601, L79

2003

Two-Dimensional Radiative Transfer in Protostellar Envelopes. II. An Evolutionary Sequence,
Whitney, B.A., **Wood, K.**, Bjorkman, J.E., & Cohen, M., 2003,
2003, ApJ, 598, 1079

Polar Fields for AB Dor,
McIvor, T., Jardine, M., Collier Cameron, A., **Wood, K.**, & Donati, J.-F.,
2003, MNRAS, 345, 601

High Latitude HI in the Low Surface Brightness Galaxy UGC 7321,
Matthews, L.D., & **Wood, K.**, 2003,
2003, ApJ, 593, 721

Two-Dimensional Radiative Transfer in Protostellar Envelopes. I. Effects of Geometry on Class I Sources,
Whitney, B.A., **Wood, K.**, Bjorkman, J.E., & Wolff, M.J.,
2003, ApJ, 591, 1049

The Far-Infrared Spectral Energy Distributions of X-ray-selected Active Galaxies,
Kuraszkiewicz, J., Wilkes, B.J., Hooper, E.J., **Wood, K.**, et al.,
2003, ApJ, 590, 128

Constraints on a Planetary Origin for the Gap in GM Aurigae's Protoplanetary Disk,
Rice, W.K.M.R., **Wood, K.**, Armitage, P.J., Whitney, B., & Bjorkman, J.E.,
2003, MNRAS, 342, 79

Spatial Study with the VLT of a New Resolved Edge-On Circumstellar Dust Disk Discovered at the Periphery of the ρ Ophiuchi Dark Cloud,
Grosso, N., Alves, J., **Wood, K.**, Neuhauser, R., Montmerle, T., & Bjorkman, J.E.,
2003, ApJ, 586, 296

NICMOS Coronagraphic Observations of the GM Aurigae Circumstellar Disk,
Schneider, G., **Wood, K.**, Silverstone, M., Hines, D.C., Koerner, D.W.,
Whitney, B., Bjorkman, J.E., & Lowerance P.J., 2003,
2003, AJ, 125, 1467

2002

Inferring X-Ray Coronal Structures from Zeeman-Doppler Images,
Jardine, M.M., **Wood, K.**, Collier Cameron, A., Donati, J-F., & MacKay, D.H.,
2002, MNRAS, 336, 1364

Can Reflection from Grains Diagnose the Albedo?
Mathis, J.S., Whitney, B.A., & **Wood, K.**,
2002, ApJ, 574, 812

Infrared Signatures of Protoplanetary Disk Evolution,
Wood, K., Lada, C.J., Bjorkman, J.E., Kenyon, S.J., Whitney, B., & Wolff, M.J.,
2002, ApJ, 567, 1183

The Spectral Energy Distribution of HH30 IRS: Constraining The Circumstellar Dust Size Distribution,
Wood, K., Wolff, M.J., Bjorkman, J.E., & Whitney, B.
2002, ApJ, 564, 887

2001

Scattered Light Models of Protostellar Envelopes: Multiple Outflow Cavities and Misaligned Circumstellar Disks,
Wood, K., Smith, D., Whitney, B., Stassun, K., Kenyon, S., Wolff, M., & Bjorkman, K.S.
2001, ApJ, 561, 299

High-Resolution Near-Infrared Images and Models of the Circumstellar Disk in HH 30 ,
Cotera, A.S., Whitney, B.A., Young, E., Wolff, M.J., **Wood, K.**, Povich, M.,
Schneider, G., Rieke, M., & Thompson, R.,
2001, ApJ, 556, 958

Resonance Line Scattering in Supernova Remnant Shocks,
Sankrit, R., & **Wood, K.**
2001, ApJ, 555, 532

Radiative Equilibrium and Temperature Correction in Monte Carlo Radiation Transfer,
Bjorkman, J.E., & **Wood, K.**
2001, ApJ, 554, 615

Modelling the Interstellar Medium of Low Surface Brightness Galaxies: Constraining Internal Extinction, Disk Color Gradients, and the Shape of Intrinsic Rotation Curves,
Matthews, L.D., & **Wood, K.**
2001, ApJ, 548, 150

2000

Escape of Ionizing Radiation from High-Redshift Galaxies,
Wood, K., & Loeb, A.
2000, ApJ, 545, 86

Optical Variability of the T Tauri Star HH30 IRS,

Wood, K., Wolk, S., Stanek, K.Z., Leussis, G., Stassun, K., Wolff, M., & Whitney, B.A. 2000
ApJ, 542, L21

Resonant Scattering of Emission Lines in Coronal Loops: Effects on Image Morphology and Line Ratios,

Wood, K., & Raymond, J.C.
2000, ApJ, 540, 563

1999

Ultraviolet Imaging Polarimetry of the Large Magellanic Cloud II: Models,

Cole, A.A., **Wood, K.**, & Nordsieck, K.H.
1999, AJ, 118, 2292

A Model for the Scattered Light Contribution and Polarization of the Diffuse H α Galactic Background,

Wood, K., & Reynolds, R.J.
1999, ApJ, 525, 799

Forming the Dusty Ring in HR4796A,

Kenyon, S.J., **Wood, K.**, Whitney, B.A., & Wolff, M.J.
1999, ApJ, 524, L119

GG Tauri's Circumbinary Disk: Models for Near-Infrared Scattered Light Images and ^{13}CO ($J=1-0$) Line Profiles,

Wood, K., Crosas, M., & Ghez, A.
1999, ApJ, 516, 335

Magnetic Accretion and Photopolarimetric Variability in Classical T Tauri Stars,

Stassun, K., & **Wood, K.**
1999, ApJ, 510, 892

1998

Scattered Light Signatures of Magnetic Accretion in Classical T Tauri Stars,

Wood, K., & Whitney, B.
1998, ApJ, 506, L43

Optical and Near-Infrared Model Images of the Circumstellar Environments of Classical T Tauri Stars,

Wood, K., Kenyon, S.J., Whitney, B., & Turnbull, M.
1998, ApJ, 497, 404

1997

Modeling Polarization Maps of External Galaxies,

Wood, K., & Jones, T.J.

1997, AJ, 114, 1105

Scattering and Dichroic Extinction: Polarimetric Signatures of Galaxies,
Wood, K. 1997, ApJ, 477, L25

Deriving the Geometry of Be Star Circumstellar Envelopes from Continuum Spectropolarimetry.
I. The Case of ζ Tauri,
Wood, K., Bjorkman, K.S., & Bjorkman, J.E.
1997, ApJ, 477, 926

1996

The Effect of Multiple Scattering on the Polarization from Axisymmetric Circumstellar Envelopes. II. Thomson Scattering in the Presence of Absorptive Opacity Sources,
Wood, K., Bjorkman, J.E., Whitney, B., & Code, A.D.
1996, ApJ, 461, 847

The Effect of Multiple Scattering on the Polarization from Axisymmetric Circumstellar Envelopes. I. Pure Thomson Scattering Envelopes,
Wood, K., Bjorkman, J.E., Whitney, B., & Code, A.D.
1996, ApJ, 461, 828 (25)

Magnetic Accretion and Photopolarimetric Variability in T Tauri Stars,
Wood, K., Kenyon, S.J., Whitney, B., & Bjorkman, J.E.
1996, ApJ, 458, L79

1992 – 1995

Effects of Pre-Scattering Attenuation on Spectropolarimetric Line Profiles,
Wood, K., & Bjorkman, J.E.
1995, ApJ, 443, 348

Effect of Electron Thermal Motions on Thomson Scattered Line Profiles from Hot Circumstellar Envelopes,
Wood, K., & Brown, J.C.
1994, A&A, 291, 202

Inversion of Thomson Scattered Line Profiles to Yield the Velocity Structure of Rotating or Expanding Circumstellar Disks,
Brown, J.C. & **Wood, K.**
1994, A&A, 290, 634

Parametric Determination of the Inclination, Velocity, and Density Structure of Circumstellar Disks from Spectropolarimetric Profiles of Scattered Lines,
Wood, K., & Brown, J.C.
1994, A&A, 285, 220

Polarimetric Line Profiles from Optically Thin Thomson Scattering Circumstellar Envelopes,
Wood, K., Brown, J.C., & Fox, G.K.

1993, A&A, 271, 492

Derivation of Episodic Mass Loss Functions for Hot Stars from Polarimetric and Absorption Line Data,

Brown, J.C., & **Wood, K.**

1992, A&A, 265, 663