Curriculum Vitae

Kevin Christopher France

Present Address:

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Education:

B.A. – *magna cum laude* with Distinction, College Prize in Astronomy - Physics and Astronomy, Boston University, May 2000
M.A. – Astrophysics, Johns Hopkins University, September 2002
Ph.D. – Astrophysics, Johns Hopkins University, November 2005
Advisor: Prof. Paul D. Feldman
Title: "Far-Ultraviolet Molecular Hydrogen Fluorescence in Photodissociation Regions"

Professional Positions:

1998 – 2000 Research Assistant, Ultraviolet Research Group, Center for Space Physics, Boston University
2000 – 2005 Research Assistant, Sounding Rocket Group, Johns Hopkins University
2005 – present Postdoctoral Fellow, Department of Physics and Astronomy, Johns Hopkins University

Research Interests:

Far ultraviolet spectroscopy, physics of molecular hydrogen formation, excitation, and interaction with dust in gaseous nebulae and the diffuse interstellar medium, spectroscopic instrumentation, calibration sources for far ultraviolet astronomy. Infrared properties of gas and dust in nebulae.

Related Research Skills:

Data analysis/language – IDL, C, C++, AutoCAD, LaTeX, *Spitzer* and *FUSE* proposal planning tools, Microsoft Word,

Microsoft Powerpoint, SkyCat and The Sky astronomy software

Optical Assembly – Experience with the design, fabrication, and Calibration of optical and ultraviolet telescopes and spectrographs

Calibration – Experience with evacuated calibration chambers and the use of photomultiplier tubes, microchannel plates, gas discharge Lamps, and electron impact / continuum lamps as calibration Soureces and targets. Additional experience with the design, Fabrication, and testing of ultraviolet calibration sources.

Research Activities:

1998 – 2000 Ground Station Manager for the TERRIERS satellite. Maintained satellite ground station including downlink antenna, telemetry and signal processing as well as software. Performed end-to-end testing of signal downlink capabilities and helped create a temporary ground station for TERRIERS at Poker Flat Research Range.

1999 Assisted in field operations for NASA/BU 36.180 UG, the second flight of the SPINR payload. Responsibilities included testing and ground station assistance.

1999 – 2000 Developed and tested optical Self-Compensating All-Reflection Interferometer (SCARI), meeting the requirements of the College of Arts and Science Work for Distinction. SCARI is a compact, high-resolution interference spectrometer designed to distinguish component structure in interstellar absorption line studies. Responsibilities included design and development of a large fraction of the optical components as well as full characterization of the spectrograph resolving power and efficiency. (Advisors: Profs. Supriya Chakrabarti and Timothy Cook, BU)

2001 – 2004 Principal Graduate Assistant on NASA/JHU 36.198 UG, the third flight an evacuated long-slit spectrograph designed for work in the far-ultraviolet (900 – 1400 Å). The goal of this flight was long-slit spectroscopy of the reflection nebula IC 405 in order to determine the ultraviolet scattering properties of interstellar dust and their relation to molecular hydrogen. Responsibilities included a full calibration of telescope reflectivity and spectrograph quantum efficiency, as well as integration and testing at White Sands Missile Range. Additionally, I guided the observation via uplink command To an on-board Attitude Control System (ACS). Following the flight I was responsible for post-flight calibrations, the full data reduction, and publication of the results.

2001 – present Primary testing and data analysis of calibration lamps for far ultraviolet spectroscopic applications. Responsibilities

included fabrication of lamp components, extensive vacuum testing, and analysis of the data requiring modeling of emission from electron impact on residual gases and thick-target bremsstrahlung.

2002 – 2005 Principal Graduate Assistant on NASA/JHU 36.208 UG, the first flight of the Long-Slit Dual Order Spectrograph (LIDOS). The goal of this instrument is to cover a large dynamic range in flux by observing bright targets with a CCD channel while simultaneously measuring faint, diffuse material with a micro-channel plate (MCP) channel. The target of this flight was the γ-Cas/IC 63 system. In addition to the responsibilities listed above, I was responsible for design and testing of the on-board calibration lamp and its associated optics as well as the secondary mirror assembly.

2002 – present Primary Data Analyst on a survey of the emission properties of molecular hydrogen in Reflection/Emission/Planetary nebulae made by the Far Ultraviolet Spectroscopic Explorer. Responsibilities included proposal preparation (science justification, Planning observational feasibility, budget management) as well As development of the data reduction tools, analysis, and Publication.

2004 – 2006 Senior Graduate Assistant on NASA/JHU 36.220 UG, the second flight of LIDOS to observe the Orion nebula and the θ Ori system. Including various responsibilities listed above, I developed and implemented new techniques to monitor telescope reflectivity during field operations and assisted the Junior Graduate Student with field procedure and ground station operation.

2004 – present Research Assistant on the design of the Far-Ultraviolet Off Rowland Circle Imaging Spectrograph (FORTIS). This instrument Is designed to determine the relative contribution of various star-forming components to the total ultraviolet flux observed in Starburst galaxies. This is a pathfinder mission to a multi-object Far-UV spectrograph to determine the escape fraction of Lyman Continuum photons in the low-redshift universe.

2005 – present Research Assistant on a *Spitzer Space Telescope* study of IC 405. This program studies spatial and spectral correlations between Dust and molecular hydrogen in this region. PAHs and H_2 are Observed with IRAC imaging and IRS spectroscopy, while the strength of the local radiation field can be determined from MIPS observations of thermal dust emission.

Refereed Publications:

K. France & S. R. McCandliss "Molecular Hydrogen in Orion as Observed by the *Far Ultraviolet Spectroscopic Explorer*" 2005, ApJL, v629

K. France, B-G Andersson, S. R. McCandliss, P.D. Feldman "Fluorescent Molecular Hydrogen in IC 63: *FUSE*, HUT, and Rocket Observations" 2005, ApJ, v628

K. France, S. R. McCandliss, E. B. Burgh, P. D. Feldman "Rocket and FUSE Observations of IC 405: Differential Extinction and Fluorescent Molecular Hydrogen," 2004, ApJ, v616

Refereed Publications in Preparation:

K. France, R. E. Lupu, and S. R. McCandliss "Discovery of Ly-α Pumped Molecular Hydrogen Fluorescence in the Planetary Nebulae NGC 6853 and NGC 3132", ApJ (2005)

S. R. McCandliss, K. R. Sembach, E. B. Burgh, K. France, P. D. Feldman, and J. W. Kruk "Hot Molecular Hydrogen in M 27", ApJ (2005)

K. France, S. R. McCandliss, E. B. Burgh, and P. D. Feldman "On the Search for Far-Ultraviolet Molecular Hydrogen Fluorescence in the Reflection Nebulae NGC 2023 and NGC 7023", ApJ (2006)

E. B. Burgh, K. France, and S. R. McCandliss "Carbon Monoxide and Molecular Hydrogen in the Diffuse Interstellar Medium", ApJ (2006)

Conference Proceedings:

K. France, B-G Anderson, S. R. McCandliss, E. B. Burgh, D. Hammer, K. E. S. Ford, D. A. Neufeld, and P. D. Feldman "Fluorescent Molecular Hydrogen in IC 63," *Astrophysics in the Far Ultraviolet*, August 2004

S. R. McCandliss, K. France, P.D. Feldman, K. Glazebrook, G. Meurer, L. Bianchi, H. W. Moos, J. W. Kruk, W. P. Blair, I. Baldry "FORTIS: Pathfinder to the Lyman Continuum," *Proceedings of the SPIE*, June 2004

S. R. McCandliss, K. France, P. D. Feldman, R. Pelton "Long-Slit Imaging Dual-Order Spectrograph: LIDOS," *Proceedings of the SPIE, 5854*, August 2002

E. B. Burgh, S. R. McCandliss, R. Pelton, K. France, P. D. Feldman "Windowless Vacuum Ultraviolet Collimator," *Proceedings of the SPIE, 4498*, July 2001

Conference Presentations:

K. France, P. D. Feldman, S. R. McCandliss, B-G Andersson, and E. B. Burgh "Far-Ultraviolet Molecular Hydrogen in Photodissociation Regions", *AAS205,* January 2006

K. France, B-G Anderson, S. R. McCandliss, and P. D. Feldman "Fluorescent Molecular Hydrogen in IC 63: *FUSE*, HUT, and Rocket Observations", *AAS 203*, January 2005

K. France, E. B. Burgh, S. R. McCandliss, P. D. Feldman "Far-Ultraviolet Dust Scattering and Extinction in IC 405," *Astrophysics of Dust*, May 2003

K. France, S. R. McCandliss, R. Pelton "Windowless Far-Ultraviolet Electron Impact Calibration Lamp," *AAS 201*, January 2003

E. B. Burgh, K. France, S. R. McCandliss, J. C. Howk "CO and H_2 in the Diffuse Interstellar Medium," *AAS 201*, January 2003

K. France, S. R. McCandliss, P. D. Feldman, E. B. Burgh "Rocket Observations of IC 405," *AAS 199*, January 2002