

Kailash Chandra Sahu

Current position

- Astronomer, Space Telescope Science Institute, 3700 San Martin Drive, Baltimore, MD 21218, Tel. (410) 338-4930, E-mail: ksahu@stsci.edu, webpage: <http://www.stsci.edu/~ksahu>

Education

- Ph.D. (Astronomy): 1985, Physical Research Laboratory, India
- M.Sc. (Physics): 1977, Berhampur University (Gold Medalist for 1st position in the University)

Professional Positions

- 1995 – present: Staff Astronomer at STScI (current position: Astronomer with tenure, WFC3/WFIRST Instrument Scientist).
- 1994 – 1995: Associate at European Southern Observatory, Munich, Germany
- 1992 – 1994: Support Astronomer at Institute of Astrophysics, Tenerife, Spain
- 1987 – 1992: Postdoc at Kapteyn Laboratory, Groningen, The Netherlands (including one and half years as support astronomer at La Palma Observatory)
- 1985 – 1987: Postdoc at Institute of Astrophysics, Paris, France

Academic Memberships

- International Astronomical Union
- American Astronomical Society
- Astronomical Society of India (Life member)

Scientific Collaborations and Related Activities

- Member of the JWST/NIRCam GTO science team
- Member of the WFIRST microlensing science team
- Founder of the PLANET (Probing Lensing Anomalies NETwork) Microlensing collaboration
- PI of the HST/SWEEPS (Sagittarius Window Eclipsing Extrasolar Planet Search) team
- PI of the HST large program (HST-GO 12586) “Detecting and Measuring the Masses of Isolated Neutron Stars and Black Holes through Astrometric Microlensing”

Awards, Editorial Positions

- STScI Outstanding Achievement award for recovery of cycle 15 science operations in 2007
- Certificate of Excellence for fast recovery of ACS operations in 2006
- GSFC/NASA Group Achievement award in 2005
- STScI science-merit award in 2001
- STScI science-merit award in 2000
- Gold Medal for highest rank in the University in M.Sc.(Physics)
- Member of the NSF review panel on Exoplanets
- Editorial Board Member for Journal of Astrophysics and Astronomy (Springer)

Current Research Interests

- Search for extra-solar planets through transits and microlensing
- Gravitational microlensing and implications on dark matter
- Astrometric microlensing by nearby high-proper-motion stars
- Detecting isolated stellar-mass black holes through astrometric microlensing
- Gamma-Ray Bursts
- Stellar Populations in the Galactic Bulge

Publications

- 335 scientific publications which include:
- 150 publications in refereed journals (including 8 in Nature and 1 in Science)
- 2 edited books
- 10 invited reviews
- 1 STIS Instrument Handbook (v3.0)
- 31 HST-related articles and Instrument Science Reports/Technical Instrument Reports

Teaching and Mentorship Activities

- Adjunct professor position at Morgan State University, Baltimore, where I taught a course on “astronomy and space science”
- Regularly supervised post-doctoral fellows working on the HST projects
- Regularly supervised Research and Instrument Analysts on various instruments on HST
- Regularly supervised summer students at STScI
- Supervised graduate students at JHU/STScI
- Taught undergraduate/graduate classes at IIT, Kapteyn Lab and JHU
- Served as a Ph.D. thesis committee member at JHU
- Served as the referee for Ph.D. students from USA, New Zealand and Australia

Languages

English, Hindi, Oriya, Spanish

Visiting Appointments

2013 Institute for Advanced Study, Princeton
2012 Center for Astrophysics, Harvard
2012 European Southern Observatory, Munich, Germany
2009 ARIES national Observatory, Nainital, India
2007 University of Tasmania, Australia
2003 European Southern Observatory, Munich, Germany

List of research grants currently held

- HST-GO (large program)-12586 “Detecting and Measuring the Masses of Isolated Black Holes and neutron Stars through Astrometric Microlensing”, PI: Sahu
- HST-GO-12988 “Accurate Mass Determination of the Old White Dwarf G105-30 through Astrometric Microlensing”, PI: Sahu

- HST-GO-13458 “Detecting Isolated Black Holes through Astrometric Microlensing”, PI: Sahu
- HST-GO-13847 “Determining the Mass of Proxima Centauri through Astrometric Microlensing”, PI: Sahu
- HST-GO-13850 “Accurate Mass Determination of the Nearby Old White Dwarf Stein 2051B through Astrometric Microlensing”, PI: Sahu
- HST archival program (AR-12134) “A Census of Milky Way Dwarfs from WFC3 Pure Parallels”, PI: Sahu
- HST EPO grant (EO-13057) “Through the Cosmic Looking Glass: Web Videos on Gravitational Lensing”, PI: Sahu

(Recent) Science-related Service Activities

- Regularly reviewed articles for ApJ, AJ, A&A and Nature. Now serving in the editorial board for the Journal of Astrophysics and Astronomy (Springer)
- Organized the STScI colloquium series for a year
- Served in the Scientific Organizing Committee of 3 STScI May symposia (“A Decade of Extrasolar Planets around Normal Stars”, “Supernovae and Gamma Ray Bursts”, and “The Dark Universe: Matter, Energy and Gravitation”)
- Served in the Organizing committee for the ICAC 2012 Kathmandu conference on “Astrophysics and Cosmology”
- Wrote a section for the science case for the proposed ATLAST mission
- Submitted a white paper to the National Academy's Exoplanet Task Force, for strategy to detect and characterize exoplanets
- Co-founded and organized PLANET Collaboration activities, including many observing programs
- Served as organizer of the Antarctica Session for the AAS meeting
- Organized the Monday Lunch talks at Kapteyn Laboratory, Groningen, for one year
- Served on several NASA Proposal Review processes
- Served as Panel Support Scientist for HST phase-I proposal reviews in 2 cycles
- Worked as a Support Astronomer at La Palma Observatory for 2 years
- Worked as a Support Astronomer at Teide Observatory (Tenerife) for 1.5 years

Some Recent Colloquia and Invited Talks

- *Recent Advances in the Study of Extra-Solar Planets*, Colloquium at NISER, Khurda Road, India, Nov 19, 2018
- A Census of Exoplanets in the Milky Way, Plenary talk at the Conference "Exploring the Universe: Near Earth space science to extragalactic astronomy", Bose Institute, Kolkata, Nov 14-17, 2018
- *Detecting Isolated Stellar-Mass Black Holes through Astrometric Microlensing Using HST*, contributed talk at the workshop on Science with Precision Astrometry, held at STScI, March 13-15, 2018
- *Study of Exoplanets and Stellar Remnants through Gravitational Microlensing*, Penn State University, Feb 14, 2018

- *Study of Exoplanets and Stellar Remnants through Gravitational Microlensing*, Embry Riddle Aeronautical University, Feb 8, 2018
- *Study of Exoplanets and Stellar Remnants through Gravitational Microlensing*, Subaru Telescope Center, Hilo, Jan 31, 2018
- *Detecting Isolated Stellar-Mass Black Holes through Astrometric Microlensing Using HST*, Invited talk at the International Microlensing Conference held at Auckland, New Zealand, Jan 25-28, 2018.
- *Proper Motions with WFIRST*, Invited talk at Sagan Exoplanet Summer School on Microlensing in the Era of WFIRST, held at NASA Exoplanet Sci. Institute, Cal Tech, Pasadena, CA, August 7-11, 2017
- *HST measures the mass of a nearby white dwarf through relativistic deflection of background starlight*, July 26, 2017, STScI Hot Sci talk.
- *The Deepest H-R Diagram of the Stars in the Galactic Bulge*, contributed talk at STScI Spring Symposium on *The 21st Century H-R Diagram*, STScI, April 23-26, 2018.
- Planets Near and Far, School of Earth and Space Exploration, Arizona State University, March 27, 2015
- Search for Other Worlds, Morgan State University, February 10, 2015
- Detecting Isolated Black Holes through Astrometric Microlensing Using HST, TIFR, Mumbai, April 15, 2014
- Detecting Isolated Black Holes through Astrometric Microlensing Using HST , Invited talk at the International conference on “Black Holes”, Kathmandu, Nepal, October 2013
- Determination of the mass of Proxima Centauri, and possible detection of its planets, Invited talk at the Gaia conference, IAP, Paris, July 2013
- Detecting Isolated, Stellar-Mass Black Holes through Astrometric Microlensing using HST, colloquium at GMRT, Pune, on May 15, 2013
- Using HST to detect isolated, stellar-mass black holes and neutron stars through microlensing, Invited Talk at Doha Microlensing Workshop, February, 2013
- Detecting Stellar Remnants through Astrometric Microlensing Using HST, Talk at IAS, Princeton, January, 2013
- Seminar on "Planet Detection via Lensing: Where have monitoring programs been, where they are going?", CfA, October 16, 2012
- Seminar on “Detecting Isolated, Stellar-Mass Black Holes through Astrometric Microlensing using HST,” CfA, Sep 27, 2012
- Luncheon talk on "Frequency of Planets across the Milky Way" at CfA/ITC, Sep 27, 2012
- “Using HST to detect isolated, stellar-mass black holes through microlensing,” colloquium at Goddard Space Flight Center, May 8, 2012
- “Detecting isolated black holes through astrometric microlensing”, Informal talk at ESO, Munich, April 11, 2012
- “A Census of Planets in the Milky Way”, colloquium at NASA Ames Research Center, March, 9, 2012
- “Using HST to detecting isolated, stellar-mass black hole through microlensing,” Invited talk at the conference on “Microlensing: Past and Future,” Doha, Qatar, Jan, 2012
- “Spectroscopy of microlensed sources”, Invited Talk at the conference on “Spectral Classification of Stars”, held at Delhi, Dec 2011

- “Study of Extra-solar Planets with the Hubble Space Telescope,” Univ. of Tasmania, Hobart, August 12th, 2010
- “Limits from SWEEPS data on substellar and planetary-mass objects through microlensing” invited talk at Microlensing workshop held at Auckland, New Zealand, Jan 21, 2010
- “Isolated Black Holes through Astrometric Microlensing Using HST,” invited talk at Microlensing workshop held at Auckland, New Zealand, Jan 21, 2010
- “Search for other worlds using the Hubble Space Telescope”, Nainital Observatory, Nainital, India, December 22, 2009
- “A kaleidoscopic view through gravity's microlenses”, Nainital Observatory, Nainital, India, December 18, 2009
- “A kaleidoscopic view through gravity's microlenses”, Physical Research Laboratory, Ahmedabad, India, December 15, 2009
- “Search for other worlds using the Hubble Space Telescope”, Physical Research Laboratory, Ahmedabad, India, December 14, 2009
- “Methods for detecting and characterizing Extrasolar Planets,” Talk to 2009 STScI summer students, August 11, 2009
- “Limits on Substellar and Planetary-Mass Objects through Microlensing from SWEEPS Data” SAAO, July 2008
- “Worlds in Transit” Univ. Arizona, March 2008

Selected Recent Observing with HST and Ground-based Telescopes

- Principal Investigator of more than 20 HST proposals, including two large proposals
- Observed with several large ground-based telescopes (VLT, Gemini) for photometric and spectroscopic observations. Some examples:
 - Gemini telescope, 3 nights, May 2014, for spectroscopic confirmation of WD and CV candidates towards the Galactic Bulge, discovered through HST
 - ESO Very large Telescope, 4 nights in June, 2004 at the 8m telescope, "Radial Velocity spectroscopic observations of SWEEPS Exoplanet Candidates"
- Co-founded the PLANET collaboration, where we conducted continuous, 24-hour monitoring of microlensing events using 4 different telescopes at appropriately spaced longitudes for several years from 1995, to look for exoplanets. Some examples:
 - ESO Danish 1.5m Telescope, 10 nights in August 2007
 - Sutherland Observatory, 2 weeks in July, 2006 at the 1m telescope,

(As a support astronomer at different observatories, I had numerous observing runs with ground-based optical telescopes, which are not listed here.)

Outreach Activities

Some of our scientific results (8 of which are published in Nature, and 1 in Science) have generated considerable interest in the media, a few recent examples of which are listed below.

- Our recent results on “Microlensing Events by Proxima Centauri in 2014 and 2016: Opportunities for Mass Determination and Possible Planet Detection” (Sahu et al. ApJ, 782, 89, 2014) were featured in:
 - A STScI press release (STScI-2013-22): “Rare Stellar Alignment Offers Opportunity to Hunt for Planets”

- A press event at the AAS meeting #222, held at Indianapolis in June 2013
- Articles in several popular science magazines including Sky & Telescope, and the online version of Scientific American
- Our recent results on detection of planets through Microlensing (Cassan et al. 2012) generated:
 - A STScI press release (STScI-2012-07): “The Milky Way Contains at Least 100 Billion Planets According to Survey”
 - Several hundred articles in international newspapers
- Our discovery of 16 exoplanet candidates towards the Galactic bulge through HST observations of the SWEEPS field was reported as an article in Nature (Sahu et al. 2006). Based on this result, there was a NASA Science Update (NSU) on October 4, 2006, titled "Hubble Finds Extrasolar Planets Far Across Galaxy" (with Jennifer Wiseman of NASA Headquarters as the moderator, and Mario Livio and Alan Boss as the other co-panelists.) The result announced in this NSU:
 - Generated articles in >1,000 newspapers and magazines (as per the list produced by the STScI OPO division) all over the world in English language alone. It also appeared in Spanish, Dutch, French, Polish, German, Hindi, Oriya, and many other language newspapers.
 - Highlighted the SWEEPS image which was voted "the picture of the week" in Time magazine.
 - Was rated by Astronomy magazine as one of the top 10 astronomical results of 2006.