

Curriculum Vitæ - Vinicius Moris Placco

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(click [here](#) for the live version)

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Personal information

Full name Vinicius [vee-nee-see-uh-s] Moris Placco
Languages Portuguese (native), English (fluent),
Spanish (intermediate), Italian (basic)
Website <http://vmplacco.github.io/>
e-mail vmplacco@gmail.com

Employment / Appointments

2020– Associate Scientist
Community Science & Data Center – US National Gemini Office
NSF's National Optical-Infrared Astronomy Research Laboratory

2015–2020 Research Assistant Professor
Department of Physics
University of Notre Dame

2018–2020 Faculty Fellow
Liu Institute for Asia and Asian Studies
University of Notre Dame

2014–2015 Science Fellow
Gemini Observatory – Northern Operations Center
Association of Universities for Research in Astronomy

2013–2014 Postdoctoral Fellow
National Optical Astronomy Observatory
Association of Universities for Research in Astronomy

2010–2013 Postdoctoral Fellow
Instituto de Astronomia, Geofísica e Ciências Atmosféricas
Universidade de São Paulo

Education

2007–2010 Doctorate degree in Astronomy
[*Search for very metal-poor stars based on carbon over-abundance*](#)
Instituto de Astronomia, Geofísica e Ciências Atmosféricas
Universidade de São Paulo

2005–2007 Master's degree in Astronomy
[*Abundance patterns among very metal-poor stars in the Galaxy: a statistical approach*](#)
Instituto de Astronomia, Geofísica e Ciências Atmosféricas
Universidade de São Paulo

2001–2005 Bachelor's degree in Physics (concentration: Astronomy)
Instituto de Física
Universidade de São Paulo

Awards

2011 *Featured Astronomy thesis of the year 2010*
Instituto de Astronomia, Geofísica e Ciências Atmosféricas
Universidade de São Paulo

2005 *Best Astronomy undergraduate project*
Instituto de Astronomia, Geofísica e Ciências Atmosféricas
Universidade de São Paulo

Observatory Experience

Leadership roles/Service

- 2020–present Hubble Space Telescope External Proposal reviewer
- 2018–present Member of the J-PAS Survey Science Committee ([Javalambre Physics of the Accelerating Universe Survey](#))
- 2018–present Co-coordinator of the Resolved Stellar Population Working Group of the J-PAS Survey
- 2018–present Member of the Maunakea Spectroscopic Explorer (MSE) [Science Team](#)
- 2017–present Co-coordinator of the Stellar Parameters Value-Added Catalog Group of the J-PLUS Survey
- 2017–present Subaru Telescope Proposal reviewer – category group: Normal Stars, Metal-Poor Stars
- 2017–present Member of the S-PLUS Advisory Committee ([Southern Photometric Local Universe Survey](#))
- 2017–present Principal Investigator of the S-PLUS Short Survey
- 2019–2020 Member of the NSF's OIR Lab Time Allocation Committee - [Galactic Panel 2](#)
- 2017–2020 US representative for the [Gemini Observatory Users Committee](#)
- 2018–2019 Member of the NOAO Time Allocation Committee - [Galactic Panel 2](#)
- 2017–2018 Member of the Gemini OCS Upgrades Working Group
- 2018 US Extremely Large Telescope Program – [First Stars Key Science Project](#)

Operations and Instrument/User Support

- 2021–present **NSF's NOIRLab Community Science & Data Center:** Communications, Education & Engagement
- 2020–present **NSF's NOIRLab Community Science & Data Center:** US National Gemini Office
- 2014–2015 **Gemini-North:** Operations
 - Support Scientist for Phase II programs
 - Backup support for instrument teams
 - Interface between observatory and visitors (staff, scientists, and others)
 - Interactions with astronomers, engineers, IT personnel, and facilities staff
 - Community support (help-desk and troubleshooting)
 - Write/edit/update internal and external webpages
 - Weekly operations meetings
 - Queue observer
 - Data reductions
- 2014–2015 **Gemini-North:** GMOS Instrument Team
 - Instrument performance monitoring pipeline
 - [Throughput characterization](#)
 - Commissioning of AO capabilities
 - Write/edit/update internal and external instrument webpages
 - Data quality assessment
 - Commissioning of Hamamatsu CCD at GMOS-S
- 2014–2015 **Gemini-North:** GRACES Instrument Team
 - Commissioning of the instrument
 - Developed early data-reduction pipeline
 - Write/edit/update internal and external instrument webpages
 - Developed exposure time calculator ([GRACES ITC v0.1 Beta](#))
- 2008–2012 **SOAR Telescope:** remote observing station – University of São Paulo
 - Responsible for operations and maintenance
 - Develop data reduction tools
 - Edit/write manuals and data analysis cookbooks
 - User support and troubleshooting
 - Configure, quote, and purchase new workstations and teleconference hardware
 - Work with university staff and IT personnel to ensure physical access to buildings and computers
 - Support daytime calibrations / nighttime observations

Observing Experience

Period	Telescope	# of nights	instrument	mode
2019–present	CTIO/Blanco	16	COSMOS	remote
2011–present	ESO/NTT	12	EFOSC2	visitor
2008–present	SOAR	40+	Goodman OSIRIS	remote
2013–2018	KPNO/Mayall	20+	RCSPEC KOSMOS	visitor/remote
2014–2015	Gemini North	12	GMOS GRACES GNIRS NIRI NIFS	queue observer
2014–2015	Gemini South	2	GMOS	remote
2013	McDonald 2.1m	4	ES2 Spectrometer	visitor

Research Experience

Funding

Past (Total: USD 470,229)

- 2020–2022 Hubble Space Telescope (Co-I)
Testing r-process nucleosynthesis models with two r-process enhanced stars
 Space Telescope Science Institute (USD 35,000)
- 2019–2021 Hubble Space Telescope (Co-PI)
HD 222925: A unique opportunity to study the full range of nuclei produced by a single r-process event
 Space Telescope Science Institute (USD 60,732)
- 2018–2020 Hubble Space Telescope (Co-PI)
The Unexplored Domains of the s-Process
 Space Telescope Science Institute (USD 119,104)
- 2018 Liu Institute for Asia & Asian Studies (PI)
Stellar Archaeology as a Time Machine to the First Stars
 University of Notre Dame (USD 600 - Travel support for conference)
- 2018 Liu Institute for Asia & Asian Studies (PI)
TDLI Workshop on The Exploding Universe
 University of Notre Dame (USD 2,600 - Travel support for conference)
- 2015–2017 Hubble Space Telescope (Co-I)
The First Detections of Phosphorus, Sulphur, and Zinc in a Bona-Fide Second-Generation Star
 Space Telescope Science Institute (USD 85,293)
- 2016–2017 Faculty Research Support Program Initiation Grant (PI)
Identification of CEMP Stars from S-PLUS Photometry using Artificial Neural Networks
 University of Notre Dame (USD 10,000)
- 2013–2014 FAPESP (State of São Paulo Research Foundation) – Postdoctorate
(re)discovery and analysis of metal-poor stars in the Milky Way
 National Optical Astronomy Observatory (USD 71,400)
- 2010–2013 FAPESP (State of São Paulo Research Foundation) – Postdoctorate
The Milky Way Halo revisited
 Universidade de São Paulo (USD 85,500)

Fellowships

- 2007–2010 Doctorate – FAPESP (07/04356-3) – Universidade de São Paulo
Search for very metal-poor stars based on carbon over-abundance
- 2005–2007 Master's – FAPESP (05/01023-8) – Universidade de São Paulo
Abundance patterns among very metal-poor stars in the Galaxy: a statistical approach
- 2004–2005 Undergraduate research project – CNPq/PIBIC – Universidade de São Paulo
Descoberta e Análise de Objetos com Linhas em Emissão no Survey HK
- 2002–2004 Undergraduate research project – FAPESP (02/04704-8) – Universidade de São Paulo
Construção de câmara de alvo gasoso para produção de feixes radioativos

Visiting Faculty/Postdoc/Graduate Student

- 2018 Universidade de São Paulo
Instituto de Astronomia, Geofísica e Ciências Atmosféricas
Funding: USP/FAPESP/JINA-CEE
- 2018 Chungnam National University
Department of Astronomy & Space Science
Funding: CNU
- 2014 University of Notre Dame
Department of Physics
Funding: Gemini Observatory and JINA (Joint Institute for Nuclear Astrophysics)
- 2014/2012 Massachusetts Institute of Technology
Kavli Institute for Astrophysics and Space Research
Funding: Gemini Observatory, FAPESP (The State of São Paulo Research Foundation – Brazil)
- 2013/2012 National Optical Astronomy Observatory
Kitt Peak National Observatory
Funding: FAPESP (Brazil)
- 2013 New Mexico State University
Department of Astronomy
Funding: FAPESP (Brazil)
- 2010/2008 Universität Heidelberg
Zentrum für Astronomie
Funding: Universität Heidelberg (Germany), FAPESP, PROEX (Brazil)
- 2010/2009 Michigan State University
2007 Physics and Astronomy Department
Funding: JINA (USA), FAPESP, PROEX (Brazil)

Academic Experience

Teaching

Lead Instructor (LI) / Co-Instructor (CI) / Guest Lecturer (GL)

Undergraduate

University of Notre Dame

- | | | |
|------|------|--|
| 2020 | (LI) | Descriptive Astronomy (SU20-PHYS-10140)
Course Instructor Feedback: 5.0/5.0 - link to full report |
| | (LI) | Descriptive Astronomy (SP20-PHYS-10140)
Course Instructor Feedback: 5.0/5.0 - link to full report |
| | (LI) | General Physics B - E & M Laboratory (SP20-PHYS-11422)
Course Instructor Feedback: 5.0/5.0 - link to full report |
| | (GL) | Engineering Physics II Laboratory (SP20-PHYS-11320) |
| | (GL) | Engineering Physics I Laboratory (SP20-PHYS-11310) |
| 2019 | (LI) | Physics A - Mechanics Laboratory (FA19-PHYS-11411)
Course Instructor Feedback: 5.0/5.0 - link to full report |
| | (LI) | Descriptive Astronomy (SU19-PHYS-10140)
Course Instructor Feedback: 5.0/5.0 - link to full report |
| 2018 | (GL) | Descriptive Astronomy (FA18-PHYS-10140) |
| 2017 | (CI) | Descriptive Astronomy (FA17-PHYS-10140) |
| | (LI) | General Physics B - E & M Laboratory (SP17-PHYS-11422)
Course Instructor Feedback: 4.8/5.0 - link to full report |
| 2016 | (GL) | Descriptive Astronomy (FA16-PHYS-10140) |
| 2015 | (GL) | Modern Observational Techniques (FA15-PHYS-30481) |

Universidade Virtual do Estado de São Paulo

- | | | |
|------|------|--------------------------------|
| 2012 | (LI) | Sky and Stars: An introduction |
| | (LI) | Galaxies: An introduction |
| 2011 | (LI) | Sky and Stars: An introduction |
| | (LI) | Galaxies: An introduction |

Graduate

University of Notre Dame

- | | | |
|------|------|--|
| 2017 | (CI) | Astrophysics: Stars (SP17-PHYS-80202) |
| 2016 | (CI) | Large-Scale Astronomical Surveys (SP16-PHYS-70210) |
| 2015 | (GL) | Astrophysics: Stars (SP15-PHYS-80202) |

Universidade de São Paulo

- | | | |
|------|------|-------------------------|
| 2012 | (GL) | Observational Astronomy |
|------|------|-------------------------|

Teaching Assistant - Universidade de São Paulo

- | | |
|------|---------------------------|
| 2009 | Introduction to Astronomy |
| | Fundamental Astronomy |
| 2008 | Introduction to Astronomy |
| 2007 | Fundamental Astronomy |

Student/Postdoc supervision

Postdoctoral level

2019–present Hélio Dotto Perottoni ([Universidade de São Paulo](#))

Graduate Level (co-advisor) - University of Notre Dame

2019–present Carlos Andrés Galarza Arevalo ([Observatório Nacional - Brazil](#))

2019–present Joseph Zepeda

2019–present Derek Shank

2015–2020 Sarah Dietz

2015–2020 Dmitrii Gudin

2015–2020 Devin Whitten

2015–2020 Kaitlin Rasmussen

2015–2017 Geoffrey Lentner

2010–2016 Rafael Santucci (M.Sc. and Ph.D. - Universidade de São Paulo)

Undergraduate Level (advisor) - University of Notre Dame

2020 Dante Komater (Physics Major)

2019–2020 Lucas Pinheiro (Engineering Major)

2019 Shenghua Liu (Physics Major)

2019 Winter Allen (Arkansas Tech University - REU)

2019 Yihao Zhou (Shanghai Jiao Tong University - REU)

2018–2020 Guilherme Limberg (Universidade de São Paulo)

2016–2018 Erik Peterson

2016–2018 David Kalamarides

2015–2018 Spencer Clark (Glynn Family Honors Program) - [Senior Thesis](#)

2016–2017 John Roach

2016–2017 Cristobal Gonzales

2016–2017 Michael Kurkowski

2017 Jazmine Jefferson (University of Kansas - REU)

2017 Derek Shank (Ohio Wesleyan University - DISC/REU) - [video report](#)

2017 Diego Fernandez (University of Oregon - REU)

2016 Travis Hodges (Austin Peay State University - DISC/REU)

2016 Miguel Correa (San Diego State University - REU)

2015 Siyu He (Xi'an Jiaotong University - REU)

2012–2014 William Alves (Universidade de São Paulo)

2008–2010 Rafael Santucci (Universidade de São Paulo)

Committee Service - University of Norte Dame

2019–2020 Undergraduate Research, Department of Physics

2016–2018 Graduate Recruitment, Department of Physics

2015–2018 Preliminary Exam Committee, Department of Physics

2015–2018 University Committee on Research & Sponsored Programs, Notre Dame Research

Thesis Defense Committee

2018–2022 Heitor Ernandes (Ph.D. - committee chair)
Universidade de São Paulo

2021 [Raphaela Fernandes de Melo](#) (M.Sc.)
Observatório Nacional

2019 [Henrique Reggiani](#) (Ph.D.)
Universidade de São Paulo

2016 [Rafael Miloni Santucci](#) (Ph.D.)
Universidade de São Paulo

2016 [Camilo Francisco Javier Muñoz Peña](#) (M.Sc.)
Universidade de São Paulo

Other relevant information

Computing skills

Linux/Unix/MACOSX/Windows operating systems
Shell Scripting (sh, bash, tcsh, zsh)
L^AT_EX, OpenOffice, MS Office. Co-author of the L^AT_EXtemplate [IAGTESE](#)
Python (iPython/Jupyter Notebooks): scipy, numpy, pandas, scikitlearn, pyfits, astropy
R-project (terminal/RStudio): FITSio, tidyverse, cluster, sciviews
Databases: SQL (PostgreSQL/pgAdmin3), SDSS CasJobs, ADQL (J-PLUS/J-PAS/TAPVizieR)
Web: html, ccs, wordpress, apache, curl, wget, ssh, ftp
Graphics: Gnuplot, ggplot2, matplotlib, bokeh, tableau
Data reduction: IRAF/Pyraf/Gemini packages, focused on spectroscopy
Astronomy tools: WCSTools, CDSclient, STILTS, SkyCalc
Version control: Git

Online Resources

Webpage: <http://vmplacco.github.io/>
LinkedIn: <https://www.linkedin.com/in/vinicius-placco/>
GitHub: <https://github.com/vmplacco/>
stackoverflow: <https://stackoverflow.com/users/5964833/vinicius-placco>
pythonanywhere: <https://vplacco.pythonanywhere.com/>
Sample webpages/
side projects: <http://vmplacco.github.io/#resources>

Professional Affiliations/Service

Member of the American Astronomical Society
Member of the Brazilian Astronomical Society
Member of the Brazilian Physical Society
Member of the JINA Center for the Evolution of the Elements

Referee for the American Astronomical Society Journals
Referee for the AAAS Science Magazine
Referee for Astronomy & Astrophysics
Referee for Monthly Notices of the Royal Astronomical Society

* Invited / Contributed talks

2021

- * Instituto Nacional de Pesquisas Espaciais – Seminários da Divisão de Astrofísica (watch it on [Youtube](#))
Stellar Archaeology and Near-Field Cosmology: Understanding the Chemical Evolution of the Universe
- * Universidade Federal de Santa Catarina – IX Encontro de Física e Astronomia da UFSC
Stellar Archaeology and Near-Field Cosmology: Understanding the Chemical Evolution of the Universe
- * Joint Institute for Nuclear Astrophysics – Physics of Atomic Nuclei High School Program
The Age and Chemical Evolution of the Universe from Two Stars in the Milky Way
- Universidade de São Paulo – S-PLUS 15th Collaboration Meeting
Searching for low-metallicity stars in S-PLUS
- * NSF's National Optical-Infrared Astronomy Research Laboratory – Live from NOIRLab @ Hawai'i (watch it on [Youtube](#))
A chemically-peculiar star found from its colors

2020

- * NSF's National Optical-Infrared Astronomy Research Laboratory – Live from NOIRLab @ Hawai'i (watch it on [Youtube](#))
The Age and Chemical Evolution of the Universe from Two Stars in the Milky Way
- * NSF's National Optical-Infrared Astronomy Research Laboratory – Gemini Observatory Science Coffee
From $R=40$ to $R=40,000$: Mining narrow-band photometric catalogs in search of low-metallicity stars
- * Joint Institute for Nuclear Astrophysics – Physics of Atomic Nuclei High School Program
The Age and Chemical Evolution of the Universe from Two Stars in the Milky Way
- * Regional Center for Space Science and Technology Education for West Asia / Arab Union for Astronomy & Space Science
Our eyes in the skies: How telescopes help us place ourselves in the Universe
- * NSF's National Optical-Infrared Astronomy Research Laboratory
Near-Field Cosmology with Narrow-Band Photometry and Spectroscopy of Low-Metallicity Stars
- * Universidade de São Paulo – Astrophysics Colloquium
Near-Field Cosmology using Narrow-Band Photometry and Low-Metallicity Stars
- * Universidade de São Paulo – Astronomia ao Meio-dia (watch it on [Youtube](#) – in Portuguese)
Agulhas no palheiro: A evolução química e idade do Universo contadas por duas estrelas

2019

- * National Optical Astronomy Observatory
Stellar Archaeology: Understanding the Chemical Evolution of the Universe through Color Maps of the Night Sky
- * Joint Institute for Nuclear Astrophysics – Physics of Atomic Nuclei High School Program
The Age and Chemical Evolution of the Universe from two stars in the Milky Way
- Consejo Superior de Investigaciones Científicas – 17th J-PAS Collaboration Meeting
Identification of Low-Metallicity Stars from Narrow-Band Photometry
- * San Francisco State University – Physics & Astronomy Colloquium
Stellar Archaeology: Origin of the Chemical Elements in the Universe through a 59-Color Map of the Sky

2018

- * Kavli IPMU at The University of Tokyo – Stellar Archaeology as a Time Machine to the First Stars
The Mass Distribution of the First Stars revealed by Abundance Pattern Matching of Ultra Metal-Poor Stars
- Kavli IPMU at The University of Tokyo – Introduction to Stellar Archaeology
Radioactive Stellar Ages
- * Texas A&M University Commerce – Physics & Astronomy Colloquium
Stellar Archaeology: Understanding the Origin of the Chemical Elements through a 59-Color Map of the Night Sky

- * Chungnam National University – Department of Astronomy & Space Science [Seminar](#)
The Origin of the Chemical Elements in the Universe revealed by a 12-Color Map of the Night Sky
- * Korea Astronomy and Space Science Institute [Colloquium](#)
Constraints on Near-Field Cosmology through Abundance Pattern Matching of Ultra Metal-Poor Stars
- * Universidade de São Paulo – [Astronomy Colloquium](#)
The Southern Photometric Local Universe Survey (S-PLUS): An Overview

Universidade de São Paulo – [S-PLUS Meeting](#)
Short update on S-PLUS SHORTS

University of Notre Dame – Astronomy 1-minute talks (23 presenters)
Organizer
- * University of Notre Dame – [Our Universe Revealed](#)
A day in the life of an Astronomer

Kavli Institute for Cosmological Physics – [Near-Field Cosmology with the Dark Energy Survey](#)
The Age Structure of the Milky Way Halo revealed by DES
- * Joint Institute for Nuclear Astrophysics – [Physics of Atomic Nuclei High School Program](#)
Can we talk about the Age and Chemical Evolution of the Universe by looking at only two stars?

Centro de Estudios de Física del Cosmos de Aragón – J-PLUS 2nd Virtual Meeting
J-PLUS Stellar Parameter Value Added Catalog
- * Shanghai Jiao Tong University – Tsung-Dao Lee Institute [Workshop on The Exploding Universe](#)
Probing the mass distribution of the first stars through abundance pattern matching of ultra metal-poor stars
- * JINA-CEE Frontiers in Nuclear Astrophysics – [Main Conference](#)
Observational constraints on the origin of the elements: from First stars to Neutron-Star mergers
- * Manhattan College – Physics Department
Understanding the Origin of the Elements in the Universe through a 12-Color Map of the Night Sky
- * JINA-CEE Frontiers in Nuclear Astrophysics – [Junior Workshop](#)
Speaking Skills
- * Centro de Estudios de Física del Cosmos de Aragón – [16th J-PAS Collaboration Meeting - Pathfinder science](#)
Constraints on First-Star Nucleosynthesis from J-PAS Photometry of Low-Metallicity Stars

Universidade de São Paulo – [S-PLUS Collaboration Meeting \(online\)](#)
Updates on S-PLUS Short Survey(s)

2017

- Universidade de São Paulo – [S-PLUS Collaboration Meeting \(online\)](#)
Updates on S-PLUS Short Survey(s)
- * Michiana Astronomical Society – [MAS monthly meeting speaker](#)
A Tale of Two Stars: Revealing the Age and Chemical Evolution of the Universe

University of Notre Dame – [Astro-Skills Lunch](#)
The do's and don'ts when plotting data

Red de Infraestructuras de Astronomía – [Early Data Release and Scientific Exploitation of the J-PLUS Survey](#)
Identification of (Bright) Carbon-Enhanced Metal-Poor Stars with J-PLUS Photometry

GMT Community Science Meeting – [Chemical Evolution of the Universe](#)
A Monte Carlo approach to find the Progenitors of Ultra Metal-Poor Stars (Rapid Poster Talk)

University of Notre Dame – [The Great American Eclipse at Notre Dame](#)
Co-organizer / Astronomy faculty representative – 3,500 attendees
- * University of Notre Dame – [Research Experiences for Undergraduates \(REU\) Program](#)
A needle in a haystack: What one star can tell us about the age and chemical evolution of the entire Universe

Centro de Estudios de Física del Cosmos de Aragón – [J-PLUS 1st Virtual Meeting](#)
Identifying (Carbon-Enhanced) Metal-Poor Stars from J-PLUS Photometry

- * Joint Institute for Nuclear Astrophysics – Physics of Atomic Nuclei High School Program
Stellar Archaeology: The Age and Chemistry of the Universe revealed by old Stars
- * Universidade de São Paulo – Astrophysics Colloquium
Searching for the Origin of the Elements Using a 12-Color Map of the Night Sky

2016

- * University of Notre Dame – Astrophysics Seminar
A Monte Carlo approach to find the Progenitors of Ultra Metal-Poor Stars
- * University of Notre Dame – Department of Physics Colloquium
Searching for the Origin of the Elements Using a 12-Color Map of the Night Sky
- University of Notre Dame – Astronomy 1-minute talks (19 presenters)
Organizer
- Universidade de São Paulo – X-PLUS Collaboration Meeting
Identifying Bright Carbon-Enhanced Metal-Poor Stars from S-PLUS Photometry
- * University of Notre Dame – Research Experiences for Undergraduates (REU) Program
Near-Field Cosmology with Metal-Poor Stars
- * University of Notre Dame – Our Universe Revealed
A day in the life of an Astronomer
- University of Notre Dame – Our Universe Revealed
Our eyes in the skies: How telescopes help us place ourselves in the Universe
- 227th Meeting of the American Astronomical Society
Identifying Bright Carbon-Enhanced Metal-Poor Stars in the RAVE Catalog

2015

- University of Notre Dame – Our Universe Revealed
The stuff we are made of: how do we determine the chemical elements in stars and the Universe?
- University of Notre Dame – Astronomy 1-minute talks (15 presenters)
Organizer
- * Joint Institute for Nuclear Astrophysics / University of Notre Dame – High School On Air Talk
Stellar Archaeology: The Age and Chemistry of the Universe revealed by old Stars – YouTube video
- * Michigan State University – JINA-CEE Nuclear Astrophysics Lunch Research Discussions
Observing the First Stars through the Atmospheres of Ultra Metal-Poor Stars
- Universidade de São Paulo – X-PLUS Collaboration Meeting
Identifying Carbon-Enhanced Metal-Poor Stars from S-PLUS Photometry
- University of Notre Dame – Research Experiences for Undergraduates (REU) Program
Galactic Archaeology: The Chemical Evolution and Age of the Universe revealed by old Stars

2014

- * University of Notre Dame – Astronomy Seminar
Exploring the history of the Galactic halo with Carbon-Enhanced Metal-Poor stars
- * Massachusetts Institute of Technology – Kavli Institute
Exploring the history of the Galactic halo with Carbon-Enhanced Metal-Poor stars

2013

National Optical Astronomy Observatory
(Carbon Enhanced) metal-poor stars and the chemical evolution of the Universe

- * Gemini Observatory – Northern Operations Center
Metal-poor stars as tracers of the chemical evolution of the Galaxy

2012

- * Universidade Cruzeiro do Sul - Astronomy Colloquium
Search for Carbon-Enhanced Metal-Poor stars in the Halo(es) of the Galaxy
- * Universidade de São Paulo - Astronomy Colloquium
Spectroscopy from $R=300$ to 30000: metal-poor stars and Galactic chemical evolution
- * Universidade de São Paulo - Invitation to Physics: undergraduate weekly seminar
Galactic Archaeology: chemical evolution of the Universe revealed by metal-poor stars
- Universidade de São Paulo - Astronomy at noon: undergraduate weekly seminar
Census of the Milky Way

2011

- Universidade de São Paulo - Chemical Evolution Group Seminar
Rediscovering the Dual Halo of the Milky Way via Hierarchical Clustering
- Universidade de São Paulo - Astronomy at noon: undergraduate weekly seminar
Stellar Archaeology
- Universidade de São Paulo - Astronomy Colloquium
Making good use of bad weather: finding extremely metal-poor stars in the clouds
- * ESO Headquarters - Santiago - Astronomy Colloquium
Searches for Metal-Poor Stars from the Hamburg/ESO Survey using the CH G-band

Quantitative Indicators

- ADS: **5362 citations** / **h-index = 34** / **i10-index = 75** (January 12, 2022 - [ADS link](#))
- Google Scholar: **6153 citations** / **h-index = 36** / **i10-index = 73** (January 12, 2022 - [Google Scholar link](#))
- ADS Publication List (complete - [ADS link](#)) / (refereed only - [ADS link](#))
- ORCID iD - [0000-0003-4479-1265](#) / ResearcherID - [C-6864-2015](#)

Publication list

Refereed articles

Total: 100 publications (incl. 15 first, 10 second, 12 third, and 13 fourth author articles)



100. Shank, D., Komater, D., Beers, T., **Placco, V. M.**, Huang, Y.
Dynamically Tagged Groups of Metal-Poor Stars II. The Radial Velocity Experiment Data Release 6
2022, The Astrophysical Journal, submitted
99. Hackshaw, Z., Ezzeddine, R., Shank, D., Shah, S., Beers, T. C., Frebel, A. Hansen, T. T., Holmbeck, E. M., Ji, A. P., Kowkabany, J., **Placco, V. M.**, Roederer, I. U., Sakari, C. M.
*The R-Process Alliance: Accretion origin of a highly enhanced *r*-process star from an LMC UFD satellite*
2022, The Astrophysical Journal, submitted
98. Roederer, I. U., Lawler, J. E., Den Hartog, E. A., **Placco, V. M.**, Beers, T. C., Ezzeddine, R., Frebel, A. Hansen, T. T., Hattori, K., Holmbeck, E. M., Sakari, C. M., Surman, R.
*The R-Process Alliance: The Nearly Complete *R*-Process Abundance Template Derived from Ultraviolet Spectroscopy of the *R*-Process-Enhanced Metal-Poor Star HD 222925*
2022, The Astrophysical Journal Supplement Series, submitted
97. Aoki, W., Beers, T. C., Honda, S., Ishikawa, H. T., Matsuno, T., **Placco, V. M.**, Yoon, J., Harakawa, H., Hirano, T., Hodapp, K., Ishizuka, M., Jacobson, S., Kotani, T., Kudo, T., Kurokawa, Y., Kuzuhara, M., Nishikawa, J., Omiya, M., Serizawa, T., Tamura, M., Ueda, A., Vievard, S.
Silicon and Strontium abundances of very metal-poor stars determined from near-infrared spectra
2021, Publications of the Astronomical Society of Japan, in press
96. Almeida-Fernandes, F., Sampedro, L., Herpich, F. R., Molino, A., Barbosa, C. E., Buzzo, M. L., Overzier, R. A., de Lima, E. V. R., Nakazono, L. M. I., Oliveira Schwarz, G. B., Perottoni, H. D., Bolutavicius, G. L., Gutiérrez-Soto, L. A., Santos-Silva, T., Vitorelli, A. Z., Werle, A., Whitten, D. D., Costa Duarte, M. V., Bom, C. R., Coelho, P., Sodré Jr., L., **Placco, V. M.**, Teixeira, G. S. M., Alonso-García, J., Beers, T. C., Kanaan, A. Ribeiro, T., Schoenell, W., Mendes de Oliveira, C.

Data Release 2 of S-PLUS: accurate template-fitting based photometry covering ~ 1000 square degrees in 12 optical filters

2021, *Monthly Notices of the Royal Astronomical Society*, in press

95. Zepeda, J., Rasmussen, K. C., Beers, T., **Placco, V. M.**, Huang, Y., Depagne, É.
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19. Yoon, J., He, S., **Placco, V. M.**, Carollo, D., Beers, T. C., *Carbon Abundance Plateaus among Carbon-Enhanced Metal-Poor Stars*, **American Astronomical Society, AAS Meeting #227**, **2016**
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Telescope time allocations

Approved observing projects: 157

Total awarded: 6400.16 hours

Principal Investigator

Approved observing projects: 47

Total awarded: 1695.55 hours

47. 2022A - CTIO Blanco - 2022A-210002: 5.0 nights
46. 2021A - Gemini South - GS-2021A-Q-419 (Band 4): 40.0 hours
45. 2021A - CTIO Blanco - 2021A-0000: 5.0 nights
44. 2020A - CTIO Blanco - 2020A-0032: 5.0 nights
43. 2019B - CTIO Blanco - 2019B-0069: 5.0 nights
42. 2019A - Gemini South - GS-2019A-Q-408 (Band 4): 21.0 hours
41. 2019A - Gemini North - GN-2019A-Q-402 (Band 4): 27.0 hours
40. 2018B - Gemini North - GN-2018B-Q-403 (Band 4): 20.0 hours
39. 2018B - Gemini South - GS-2018B-Q-402 (Band 4): 20.0 hours
38. 2018A - Gemini South - GS-2018A-Q-402 (Band 4): 30.0 hours
37. 2017B - Gemini North - GN-2017B-Q-84 (Band 4): 39.0 hours
36. 2017A - Gemini South - GS-2017A-FT-3: 5.5 hours
35. 2017A - KPNO Mayall - 2017A-0295: 7.0 nights
34. 2016B - Gemini North - GN-2016B-Q-85 (Band 4): 50.0 hours
33. 2016B - Gemini South - GS-2016B-Q-86 (Band 4): 50.0 hours
32. 2016A - Gemini South - GS-2016A-Q-107 (Band 4): 50.0 hours
31. 2015B - Gemini North - GN-2015B-Q-100 (Band 4): 30.0 hours
30. 2015B - Gemini South - GS-2015B-Q-104 (Band 4): 50.0 hours
29. 2015B - ESO/NTT - 096.D-0018(A): 5.0 nights
28. 2015A - Gemini North - GN-2015A-Q-401 (Band 4): 30.0 hours
27. 2015A - Gemini South - GS-2015A-Q-205 (Band 4): 50.0 hours
26. 2015A - ESO/NTT - 095.D-0202(A): 4.0 nights
25. 2015A - KPNO Mayall - 2015A-0071: 6.0 nights
24. 2015A - SOAR - 2015A-0071: 5.0 nights
23. 2014B - Gemini South - GS-2014B-Q-85 (Band 4): 30.0 hours
22. 2014B - Gemini North - GN-2014B-Q-102 (Band 4): 30.0 hours
21. 2014A - Gemini South - GS-2014A-Q-92 (Band 4): 33.3 hours
20. 2014A - Gemini North - GN-2014A-Q-101 (Band 3): 16.7 hours
19. 2014A - Gemini North - GN-2014A-Q-105 (Band 4): 33.3 hours
18. 2013B - Gemini South - GS-2013B-Q-89 (Band 4): 25.0 hours
17. 2013B - Gemini North - GN-2013B-Q-105 (Band 4): 25.0 hours
16. 2013B - SOAR - SO2013B-001: 30.0 hours
15. 2013A - SOAR - SO2013A-018: 34.0 hours

14. 2012B - Gemini South - GS-2012B-Q-65 (Band 3): 10.0 hours – queue
13. 2012B - Gemini South - GS-2012B-Q-84 (Band 4): 70.0 hours – queue
12. 2012B - Gemini North - GN-2012B-Q-284 (Band 4): 70.0 hours – queue
11. 2012B - ESO/NTT - 090.D-0275(A): 4 nights – classical
10. 2012B - SOAR - SO2012B-001: 24.0 hours – remote
9. 2012A - Gemini South - GS-2012A-Q-76 (Band 3): 6.0 hours – queue
8. 2012A - ESO/NTT - 089.D-0331(A): 4 nights – classical
7. 2012A - SOAR - SO2012A-003: 24.0 hours – remote
6. 2011B - ESO/NTT - 088.D-0344(A): 4 nights – classical
5. 2011B - SOAR - SO2011B-002: 24.0 hours – remote
4. 2011A - Gemini South - GS-2011A-Q-86 (Band 4): 4.0 hours – queue
3. 2011A - Gemini North - GN-2011A-Q-88 (Band 3): 1.3 hours – queue
2. 2011A - Gemini North - GN-2011A-Q-122 (Band 4): 6.7 hours – queue
1. 2011A - SOAR - SO2011A-010: 17.0 hours – remote

Co-Investigator

Approved observing projects: 110

Total awarded: 4704.61 hours

110. 2022A - SOAR - 2022A-001: 8 hours
109. 2022A - SOAR - 2022A-006: 40 hours
108. 2022A - Subaru - KR-2022A-008: 10.00 hours
107. 2022A - Gemini South - GS-2022A-Q-118 (Band 1): 1.20 hours
106. 2022A - Gemini South - GS-2022A-Q-233 (Band 2): 11.00 hours
105. 2021B - Gemini North - GN-2021B-Q-111 (Band 1): 9.70 hours
104. 2021B - Gemini South - GS-2021B-Q-127 (Band 1): 2.20 hours
103. 2021B - Gemini South - GS-2021B-Q-232 (Band 2): 6.10 hours
102. 2021B - Gemini South - GS-2021B-Q-130 (Band 1): 3.60 hours
101. 2021B - Gemini South - GS-2021B-Q-321 (Band 3): 16.60 hours
100. 2021A - Gemini North - GN-2021A-FT-209 (Band 1): 2.20 hours
99. 2021A - Gemini North - GN-2021A-FT-205 (Band 1): 3.00 hours
98. 2021A - Gemini North - GN-2021A-Q-111 (Band 1): 14.20 hours
97. 2021A - Gemini South - GS-2021A-Q-230 (Band 2): 10.00 hours
96. 2021A - SOAR - 2021A-007: 40 hours
95. 2020A - McDonald 2.7m - McD20-1-2.7-7: 7.0 nights
94. 2019B - Gemini North - GN-2019B-Q-403 (Band 4): 9.40 hours
93. 2019B - McDonald 2.7m - McD19-3-2.7-1: 7.0 nights
92. 2019B - SOAR - 2019B-0013: 26 hours
91. 2019A - Gemini North - GN-2019A-Q-309 (Band 3): 22.73 hours
90. 2019A - McDonald 2.7m - McD19-1-2.7-3: 17.0 nights
89. 2019A - McDonald 2.1m - McD19-1-2.7-1: 5.0 nights

88. 2018B - Gemini North - GN-2018B-Q-122 (Band 1): 10.0 hours
87. 2018B - Gemini North - GN-2018B-Q-316 (Band 3): 25.00 hours
86. 2018B - Gemini South - GS-2018B-Q-315 (Band 3): 47.27 hours
85. 2018B - SOAR - 2018B-0010: 26 hours
84. 2018A - Gemini North - GN-2018A-Q-403 (Band 4): 89.10 hours
83. 2018A - Gemini South - GS-2018A-Q-406 (Band 4): 7.90 hours
82. 2018A - LCO/Magellan Telescope - Carnegie Time: 2 nights
81. 2018A - LCO/duPont Telescope - Carnegie Time: 18 nights
80. 2018A - Apache Point Observatory - UW08: 5.0 nights
79. 2018A - LCO/Magellan Telescope - Chilean Time: 3 nights
78. 2018A - SOAR - 2018A-0021: 36 hours
77. 2018A - McDonald 2.7m - McD18-1-2.7-3: 7.0 nights
76. 2017B - LCO/Magellan Telescope - Michigan Time: 2.5 nights
75. 2017B - Gemini North - GN-2017B-Q-18 (Band 1): 10.2 hours
74. 2017B - Gemini North - GN-2017B-FT-7: 6.28 hours
73. 2017B - Gemini North - GN-2017B-Q-75 (Band 3): 41.82 hours
72. 2017B - Gemini North - GN-2017B-Q-79 (Band 4): 63.64 hours
71. 2017B - Gemini South - GS-2017B-Q-75 (Band 3): 20.91 hours
70. 2017B - Gemini South - GS-2017B-Q-84 (Band 4): 107.82 hours
69. 2017A - Southern African Large Telescope - 2017-1-MLT-012: 55.6 hours
68. 2017A - Gemini North - GN-2017A-Q-82 (Band 3): 202.0 hours
67. 2017A - Gemini South - GS-2017A-Q-86 (Band 3): 142.5 hours
66. 2017A - ESO/NTT - 099.D-0428: 5.0 nights
65. 2017A - LCO/Magellan Telescope - Carnegie Time: 3 nights
64. 2017A - LCO/duPont Telescope - Carnegie Time: 19 nights
63. 2017A - SOAR - 2017A-0016: 40 hours
62. 2016B - Gemini North - GN-2016B-Q-77 (Band 3): 6.4 hours
61. 2016B - Gemini South - GS-2016B-Q-81 (Band 3): 32.3 hours
60. 2016B - ESO/NTT - 098.D-0434: 4.0 nights
59. 2016B - Hubble Space Telescope - Cycle 24 - HST-GO-14765: 40 orbits
58. 2016B - LCO/duPont Telescope - Carnegie Time: 5 nights
57. 2016A - ESO/NTT - 097.D-0196: 7.0 nights
56. 2016A - Apache Point Observatory - UW07: 2.5 nights
55. 2016A - Gemini North - GN-2016A-Q-17 (Band 1): 9.8 hours
54. 2016A - Gemini North - GN-2016A-Q-75 (Band 3): 79.4 hours
53. 2016A - Gemini South - GS-2016A-Q-76 (Band 3): 74.0 hours
52. 2016A - SOAR - 2016A-0019: 4.0 nights
51. 2015B - Southern African Large Telescope - 2015-2-SCI-056: 117.8 hours
50. 2015B - Hubble Space Telescope - Cycle 23 - HST-GO-14231: 18 orbits
49. 2015B - Gemini North - GN-2015B-Q-86 (Band 3): 26.5 hours

48. 2015B - Gemini South - GS-2015B-Q-71 (Band 3): 42.9 hours
47. 2015B - SOAR - 2015B-0020: 5.0 nights
46. 2015A - ESO/VLT - 095.D-0504(A): 30.0 hours
45. 2015A - Gemini North - GN-2015A-Q-76 (Band 3): 45.8 hours
44. 2015A - Gemini South - GS-2015A-Q-77 (Band 3): 42.8 hours
43. 2015A - Gemini South - GS-2015A-Q-92 (Band 4): 26.0 hours
42. 2014B - ESO/VLT - DDT293.D-5036(A): 2.4 hours
41. 2014B - Gemini South - GS-2014B-Q-67 (Band 3): 55.0 hours
40. 2014B - Gemini North - GN-2014B-Q-85 (Band 3): 55.0 hours
39. 2014B - KPNO Mayall - 2014B-0231: 3.0 nights
38. 2014B - SOAR - 2014B-0231: 3.0 nights
37. 2014A - Gemini South - GS-2014A-Q-88 (Band 3): 66.7 hours
36. 2014A - KPNO Mayall - 2014A-0323: 8.0 nights
35. 2013B - KPNO Mayall - 2013B-0046: 6.5 nights
34. 2013B - Gemini South - GS-2013B-Q-75 (Band 3): 50.0 hours
33. 2013B - Gemini North - GN-2013B-Q-81 (Band 3): 50.0 hours
32. 2013B - SOAR - SO2013B-S102: 17.0 hours (long term)
31. 2013B - ESO/NTT - 092.D-0308(A): 6 nights
30. 2013B - McDonald 2.1m - McD13-3: 5 nights
29. 2013B - LNA/Brazil - 2013B-P012: 6 nights
28. 2013B - NOT (Nordic Optical Telescope) - 48-031: 3.5 nights
27. 2013A - Gemini North - GN-2013A-Q-113 (Band 4): 54.5 hours
26. 2013A - Gemini South - GS-2013A-Q-91 (Band 3): 54.6 hours
25. 2013A - Gemini South - GS-2013A-Q-95 (Band 4): 10.9 hours
24. 2013A - ESO/NTT - 091.D-0292(A): 6 nights
23. 2013A - LNA/Brazil - 2013A-P030: 4 nights
22. 2013A - SOAR - SO2013A-LP2: 17.0 hours (long term)
21. 2013A - NOT (Nordic Optical Telescope) - 47-003: 3.0 nights
20. 2012B - NOT (Nordic Optical Telescope) - 46-011: 2.5 nights
19. 2012B - ESO/VLT (X-Shooter) - 090.D-0321(A): 12 hours
18. 2012B - LCO/Magellan - MAG/12B/9: 2 nights
17. 2012B - AAO/AAT - AAT/12B/032: 6 nights
16. 2012B - SOAR - SO2012B-005: 8.0 hours (long term)
15. 2012A - Gemini South - GS-2012A-Q-81 (Band 4): 74.0 hours
14. 2012A - AAO/AAT - AAT/12A/011: 4 nights
13. 2012A - LCO/Magellan - MAG/12A/7: 2 nights
12. 2012A - SOAR - SO2012A-002: 16.0 hours
11. 2011B - Gemini South - GS-2011B-Q-91 (Band 4): 75.0 hours
10. 2011B - SOAR (SO2011B-008): 24.0 hours
9. 2011A - Gemini South - GS-2011A-Q-85 (Band 3): 63.4 hours

8. 2011A - CFHT - CF2011A-002: 13.9 hours
7. 2010B - CFHT - 10BB05A/10BB99B: 13.9 hours
6. 2010A - Gemini South - GS-2010A-Q-78 (Band 4): 25.0 hours
5. 2009B - SOAR - SO2009B-004: 17.0 hours
4. 2009A - SOAR - SO2009A-0249: 6 nights
3. 2009A - SOAR - SO2009A-014: 32.0 hours
2. 2008A - SOAR - SO2008A-006: 3 nights
1. 2007B - SOAR - SO2007B-006: 3 nights

Press releases, articles, and media resources

2021

NBC News

[*An ancient star casts new light on the birth of the universe*](#)

Phys.org

[*Reseachers detect a new ultra-metal-poor star*](#)

NOIRLab Stories

[*Ultra Metal-Poor Star Discovery*](#)

Revista FAPESP (featured article)

[*Star Fossil*](#)

S-PLUS Press Release

[*Astronomers discover an ultra metal-poor star that challenges models for the evolution of the first stars*](#)

India Education Diary

[*University Of São Paulo: Astronomers Discover Star That Challenges Current Models Of Evolution Of The Universe*](#)

Jornal da USP (in Portuguese)

[*Astrônomos descobrem estrela que desafia modelos atuais de evolução do Universo*](#)

Ravista FAPESP (in Portuguese)

[*Fóssil Estelar*](#)

Observatório Nacional (in Portuguese) - [Audio interview](#)

[*Astrônomos descobrem estrela que desafia modelos atuais de evolução do Universo*](#)

Revista Planeta (in Portuguese)

[*Achada estrela que desafia modelos atuais de evolução do universo*](#)

tilt UOL (in Portuguese)

[*"Ultrapobre": brasileiros encontram uma das estrelas mais raras do universo*](#)

Sputnik News Brasil (in Portuguese)

[*Detectada estrela recordista em carência metálica que pode explicar evolução inicial do Universo*](#)

Hypeness (in Portuguese)

[*Telescópio com tecnologia brasileira localiza estrela mais velha que o Sol*](#)

Notícias da Universidade Federal de Santa Catarina (in Portuguese)

[*Projeto internacional de astronomia com participação da UFSC descobre estrela rara*](#)

Agência Brasil - Rádio Nacional (in Portuguese - with audio interview)

[*Universo: cientistas descobrem estrela rara e considerada ultrapobre*](#)

CAPES - Ministério da Educação (in Portuguese)

[*Estrela rara desafia lógica da astrofísica*](#)

TEKCRISPY (in Spanish)

[*La humanidad podría haber descubierto una de las estrellas más antiguas del universo*](#)

NOIRLab Stories (in Spanish)

[*Descubrimiento de una estrella ultra pobre en metal*](#)

2020

Phys.org (online)

[*Peculiar chemical abundance pattern detected in the star RAVE J183013.5-455510*](#)

Inside Higher Ed (online)

The rise of the remote Ph.D. defense

Gemini Observatory - [GeminiFocus](#) 2019 Year In Review (online)

[Making Good Use of Bad Weather: Finding Metal-poor Stars Through the Clouds](#)

2019

MIT News (online)

[Explosions of universe's first stars spewed powerful jets](#)

Gemini Observatory News (online)

[Making Good Use of Bad Weather: Finding Metal-poor Stars Through the Clouds](#)

Gemini Observatory - [GeminiFocus](#) April 2019 Lead Science Article (online)

[Making Good Use of Bad Weather: Finding Metal-poor Stars Through the Clouds](#)

2018

Notre Dame Science - Department of Physics News (online)

[Summertime Stargazing event draws large crowd](#)

Notre Dame Stories (online)

[Heavy Metals](#)

2017

Revista FAPESP (in Portuguese - online)

[Fonte de ouro e régua do universo](#)

Agência FAPESP (in Portuguese - online)

[Nova fonte de ondas gravitacionais é observada](#)

Notre Dame News (online)

[Students in right place, right time witness first-ever detected neutron star collision](#)

Notre Dame College of Science News (online)

[Astrophysics graduate students witness first-ever detected neutron star collision](#)

Agência FAPESP (in Portuguese - online)

[Estudo detecta elétrons duplamente acelerados no choque de aglomerados de galáxias](#)

École Polytechnique News (online)

[The inaugural issue of Nature Astronomy features the work of F. Andrade-Santos](#)

Jornal da USP (in Portuguese - online)

[Cientistas descobrem poderosa colisão cósmica dupla](#)

Folha de São Paulo (in Portuguese - online)

[Quando aglomerados de galáxias colidem e um buraco negro gigante entra no meio da história](#)

Nature Astronomy (online - issue cover)

[The case for electron re-acceleration at galaxy cluster shocks](#)

Chandra X-ray Observatory Blog (online)

[The Discovery of Particle Re-acceleration in a Galaxy Cluster Collision](#)

Notre Dame News (online)

[Notre Dame astrophysicist confirms source of galaxy collision](#)

2016

Nature Physics (online - issue cover)

[The age structure of the Milky Way's halo](#)

Notre Dame News (online)

Second-generation stars identified, giving clues about their predecessors

Science Alert (online)

Astronomers have created the most detailed age map of the Milky Way yet

Universe Today (online)

Best picture yet of Milky Way's formation 13.5 billion years ago

Notre Dame News (online)

Detailed age map shows how Milky Way came together

Daily Mail (online)

How the Milky Way formed: Stunning 3D maps show how 130,000 stars came together 13.5 billion years ago

Daily Mail (online)

Graphic shows age structure of the Milky Way's halo

Astrobites (online)

Our halo is getting younger, spatially speaking

UPI (online)

New map details formation of the Milky Way galaxy

International Business Times (online)

How Did The Milky Way Form? New Chronographic Map Provides Answers

Phys.org (online)

Detailed age map shows how Milky Way came together

Reddit Journal of Science (online)

Detailed age map shows how Milky Way came together

Science Daily (online)

Detailed age map shows how Milky Way came together

Laboratory Equipment (online)

Detailed age map shows how Milky Way came together

Geek Journal (online)

Detailed age map shows how Milky Way came together

AboNewsCast (online)

Detailed age map shows how Milky Way came together

Science Newsline (online)

Detailed age map shows how Milky Way came together

MSU Today (online)

Astronomers pinpoint how Milky Way Galaxy was formed

Ancient Code (online)

How the Milky Way formed: Awesome 3D map shows how 130,000 stars merged

Astro Watch (online)

Detailed Age Map Shows How Milky Way Came Together

Science Bulletin (online)

Detailed Age Map Shows How Milky Way Came Together

Science Blog (online)

Astronomers pinpoint how Milky Way Galaxy was formed

EurekAlert! (online)

Detailed Age Map Shows How Milky Way Came Together

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[Detailed Age Map Shows How Milky Way Came Together](#)

Life Science Network (online)
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