Geray Karademir

Title

The Galaxy Luminosity Function via Clustering Based Redshift Inference: can we find the bottom of the galaxy population?

Abstract

The galaxy luminosity function (GLF) is a basic descriptor of the galaxy population and its evolution though the history of the Universe. I will present a new experimental design using clustering-based redshift inference to measure the evolving galaxy luminosity function. The idea is to exploit the fact that galaxies are not uniformly distributed through space; instead are strongly clustered and it is therefore possible to infer the statistical distribution of distances.

We derive the GLF using data from the Galaxy And Mass Assembly (GAMA) survey and the Kilo-Degree Survey (KiDS) to the limits of the GAMA-KiDS photometric catalogue: $m\_r \sim 23$; more than a decade in luminosity beyond the limits of the GAMA spectroscopic redshift sample.

We find that the GLF has a relatively constant power-law slope $\alpha \approx -1.2$ for $M\_r < -13$, and then appears to steepen sharply. This upturn appears to be where Globular Clusters (GCs) take over to dominate the source counts as a function of luminosity. Thus we have mapped the GLF across the full range of the $z\sim0$ field galaxy population from the most luminous galaxies down to the GC scale.

Geray Karademir | Curriculum Vitae

Centre for Astrophysics and Supercomputing – Swinburne University of Technology
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Education

Since 2019	Ph.D. student at the Centre for Astrophysics and Supercomputing at the Swinburne University of Technology, Australia Advisors: A. Prof. Edward N. Taylor, Prof. Chris Blake
2018	Master of Science in astrophysics at the University Observatory of the Ludwig-Maximilians-University Munich, Germany Thesis: "Simulated galaxy interactions in cosmological and idealized environments" Advisors: PD Dr. Klaus Dolag, Dr. Rhea-Silvia Remus
2016	Bachelor of Science in physics at the Ludwig-Maximilians-University Munich, Germany Thesis: "Correlation of multi-wavelength-observations in the open cluster NGC 3293" Advisor: Prof. Thomas Preibisch

Awards

2019 – present	Swinburne University Postgraduate Research Award

Publications

11/2021	**Geray S. Karademir**, Edward N. Taylor, et al.: "Galaxy And Mass Assembly (GAMA): $z\sim0$ Galaxy Luminosity Function down to $L\sim10^6\,L_{sol}$ via Clustering Based Redshift Inference" (MNRAS, 509, 5467, 2021)
07/2019	**Geray S. Karademir**, Rhea-Silvia Remus, et al.: „The outer stellar halos of galaxies: how radial merger mass deposition, shells, and streams depend on infall-orbit configurations" (MNRAS, 487, 318, 2019)

Teaching

2020	Collegiate assistant for the lecture "Aviation Mathematics" at Swinburne University of Technology
2019 - 2020	Collegiate assistant at the Mathematics and Statistics Help (MASH) Centre at Swinburne University of Technology

2015 - 2016	Collegiate assistant for the lecture "Mechanics for physicists" at the Ludwig-Maximilians-University Munich
2014 - 2018	Collegiate assistant at the physics laboratory of the physicians at the Ludwig-Maximilians-University Munich

Talks and posters

2021	Poster: "Searching for the faint end of the galaxy luminosity function", Annual Scientific Meeting of the Astronomical Society of Australia (virtual)
2020	Invited talk: "Clustering-based redshift inference: Deriving the luminosity function evolution", at the University Observatory of the Ludwig-Maximilians-University Munich, Germany (virtual)
2019	Contributed talk: "The outer stellar halos of galaxies", at the Mount Stromlo Student Seminars, The Australian National University Research School of Astronomy and Astrophysics, Australia

Workshops, and scientific visits

2020 - 2022	Visitor at the German Centre for Cosmological Lensing (GCCL), Ruhr-University Bochum, Germany (virtual)
2020	ADACS astro-computational hack week, Macquarie University Sydney, Australia
2019	ASA Harley Wood Winter School of Astronomy, University of Queensland Brisbane, Australia

Outreach and community engagement

2019 - present	AstroTour guide at Swinburne University of Technology
2020	Organizer of the Astro-ph Journal Club at the Centre for Astrophysics and Supercomputing
2018 – 2019	Assistant at the University Observatory of the Ludwig-Maximilians-University Munich for the planetarium show "Ausgerechnet! – Unser Universum" for the Deutsches Museum in Munich