Kareem El-Badry

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Research Interests

binary stars, stellar mass black holes, white dwarfs;
near-field cosmology, galactic archaeology, globular clusters;
galaxy formation, low-mass galaxies, stellar feedback

Education

Ph.D., Astrophysics, University of California, Berkeley 2021
Advisors: Eliot Quataert, Dan Weisz

M.A., Astrophysics, University of California, Berkeley 2018
B.S., Astrophysics, *summa cum laude*, Yale University 2016
Advisor: Marla Geha

Research Positions

Junior Fellow, Harvard Society of Fellows	2021–
ITC Fellow, Harvard-Smithsonian Center for Astrophysics	2021–
Postdoctoral Fellow, recurring summer appointment, MPIA, Heidelberg	2021–
Graduate Student, UC Berkeley	2016 – 2021
Kavli Summer Research Fellow, CCA, NYC	2018
Summer Visiting Researcher, MPIA, Heidelberg	2017 – 2020
Summer Undergraduate Research Fellow, Caltech	2015
Undergraduate Research Assistant, Yale	2015 – 2016
Dean's Summer Research Fellow, Yale	2014

Honors & Awards

Mary Elizabeth Uhl Dissertation Prize, Berkeley	2021
Outstanding Graduate Student Instructor Award, Berkeley	2021
Robert J. Trumpler Graduate Student Excellence Award, Berkeley	2020
CCAPP Price Prize in Cosmology and AstroParticle Physics	2018
NSF Graduate Research Fellowship	2016 – 2021
Berkeley Fellowship	2016 – 2018
Hellman Award for Graduate Study	2016 – 2018
George Beckwith Prize in Astronomy, Yale	2016
Phi Beta Kappa, Yale	2015
Jerry Inskeep Memorial Scholarship, Yale	2014

Awarded Telescope Time

CO-I: NTT 3.6m - 3 nights (PI: Matthew Green) 2021
Revealing the population of detached black hole and neutron star binaries from TESS
PI: Keck - 2 nights 2021
The progenitors of extremely low-mass white dwarfs
PI: MPG/ESO La Silla 2.2m - 140 hours 2021
A search for detached black holes and neutron stars
CO-I: LBT 2×8.4 m - 3 hours (PI: David Martin) 2021
Characterizing the atmosphere of the exoplanet-companion white dwarf TOI-1259B
PI: Las Cumbres Observatory 2×1 m - 1.5 nights 2021
Spectral disentangling of a mass-transfer binary with NRES
PI: Lick Shane 3m - 10 nights 2021
Characterization of mass-transfer binaries

PI: MPG/ESO La Silla 2.2m - 140 hours 2020
Searching for detached black holes with FEROS
PI: Lick Shane 3m - 15 nights 2020
A search for detached black holes in binaries
PI: MPG/ESO La Silla 2.2m - 60 hours 2020
A search for detached black holes in binaries
PI: Lick Shane 3m - 5 nights 2020
A search for detached black holes in binaries
CO-I: Keck - 2 nights (PI: Alexie Leauthaud) 2019
Testing the Feedback-driven Breathing Mode in Dwarf Galaxies at $z \approx 0.1$
CO-I: La Silla MPG 2.2 m - 150 hours (PI: Hans-Walter Rix) 2019
Wide Binaries as Fundamental Calibrators of Galactic Archeology
CO-I: Magellan - 3 nights (PI: Yuan-Sen Ting) 2018
The Chemical Homogeneity of Wide Binaries in Gaia DR2
CO-I: McDondald - 5 nights (PI: Keith Hawkins) 2018
The Chemical Homogeneity of Wide Binaries in Gaia DR2
CO-I: Keck - 7 nights total (PI: Tucker Jones) 2017, 2018
Dissecting Galaxy Formation and Testing Feedback Models on 100 pc Scales: An OSIRIS Survey of Lensed Galaxies at $z = 2$
CO-I: Keck - 2.5 nights (PI: Dan Weisz) 2017
Stellar Chemistry in Isolated Dwarf Galaxies
PI: Palomar Hale 200 inch - 1 night 2015
Probing Radial Star-Formation Histories of Isolated Dwarf Galaxies
CO-I: Keck - 1 night (PI: Andrew Wetzel) 2015
Constraining Star-Formation Quenching Mechanisms using Isolated Low-Mass Galaxies

Awarded Supercomputing Time

PI: NERSC Cori/KNL Early Access - 4.7 M cpu-hours 2017
Simulating the Formation of Dwarf Galaxies

Observing Experience

Public data – significant experience with data from Gaia, Kepler/K2, TESS, LAMOST, SDSS, ZTF
Lick Shane telescope, KAST Spectrograph – 28 nights 2020-2021
Keck DEIMOS – 2.5 nights 2017
Palomar Hale telescope, Wide-Field IR Camera – 1 night 2015
Keck ESI – 3 nights 2015, 2016
WIYN, Hydra Multi-Fiber Spectrograph – 2 nights 2014
Arecibo, L-Band HI – 2 nights 2013, 2014

Journal Referee

A&A, A&AL, ApJ, ApJL, MNRAS, MNRASL, SCPMA 18 papers total; 2017 –

Student mentoring

Pranav Nagarajan (Berkeley undergrad) 2020–
Mapping the Local Group with RR Lyrae stars
Nick Choksi (Berkeley undergrad; now Berkeley grad student) 2018 – 2019
Forecasting high-redshift observations of globular cluster formation

Teaching Experience

Co-Instructor, Astro 375, *Graduate Pedagogy*, UC Berkeley	2019, 2020
Sole Instructor, *Stellar Physics*, Hyeonpung High School, Daegu, South Korea	2019
Graduate Student Instructor, Astro 128, *Astronomy Data Lab*, UC Berkeley	2019, 2020, 2021
Course Designer, Astro 128, *Astronomy Data Lab*, UC Berkeley	2018, 2019, 2020
Graduate Student Instructor, Astro 160, *Stellar Physics*, UC Berkeley	2018
Graduate Student Instructor, Astro 7A, *Introduction to Astronomy*, UC Berkeley	2017
Graduate Student Instructor, Astro C12, *The Planets*, UC Berkeley	2017
Tutor & Grader, Math 120, *Multivariable Calculus*, Yale	2013 – 2016
Tutor, Math 111, *College Algebra*, Umpqua Community College	2013

Recent Talks

Binary stars as probes of stellar evolution and fundamental physics – Königstuhl Colloquium, MPIA	2021
Binary stars as probes of stellar evolution and fundamental physics – Colloquium, CIERA/Northwestern	2021
Emission-line stars and binary mass transfer – Astronomy seminar, University of Warwick	2021
Globular clusters as tracers of halo assembly – Lunch talk, UC Berkeley	2021
Binary stars as probes of stellar evolution and fundamental physics – Colloquium, UC Berkeley	2021
Binary stars as probes of stellar evolution and fundamental physics – Colloquium, Caltech	2021
Binary stars as probes of stellar evolution and fundamental physics – Colloquium, U. Chicago	2021
Binary stars as probes of stellar evolution and fundamental physics – Colloquium, U. Utah	2021
Found: the cataclysmic variable progenitors of ultra-compact binaries – Lunch talk, Berkeley	2020
Emission-line stars, binary mass transfer, and dormant black holes – Tea talk, Caltech	2020
A companion-stripping origin for Be stars – CIERA seminar, Northwestern	2020
Emission-line stars, mass transfer, and the search for stellar-mass black holes – Colloquium, Princeton	2020
A stripped star a day keeps the black holes away – Galaxy coffee, MPIA, Heidelberg	2020
A stripped-companion origin for Be stars – Bildsten group meeting, KITP	2020
Caught in the act: a stripped-companion origin for Be stars – Lunch talk, UC Berkeley	2020
Be stars masquerading as black holes – Special discussion on HR 6819, compact objects group, CCA	2020
Black holes in detached binaries – Virtual ZTF theory meeting	2020
Wide binaries as probes of star formation and dynamical evolution – Astronomy seminar, U. Chicago	2019
Hunting for black holes in detached Galactic binaries – KIPAC Tea Talk, SLAC	2019
Separated at birth? An unexpected population of identical-twin binaries – Lunch talk, UC Berkeley	2019
Wide binaries as probes of star formation and evolution – Astronomy seminar, Boston University	2019
Wide binaries as dynamical probes – Galaxies and cosmology seminar, Harvard CFA	2019
Binary stars in wide-field surveys – Tea talk, Caltech	2019
Twin binaries – The Milky Way 2019: LAMOST and other Leading Survey meeting, Yichang, China	2019
Wide binaries as probes of star formation and evolution – Charles University, Prague, Czech Republic	2019
Wide binaries in 2019 – Universe of Binaries meeting, Telč, Czech Republic	2019
Gas kinematics of low-mass galaxies – CosmoDwarfs meeting, Durham, UK	2019
Conduction and cooling in supernovae-driven superbubbles – Galaxy coffee, MPIA, Heidelberg	2019
A new model for superbubbles driven by clustered supernovae – Lunch talk, UC Berkeley	2019
Successes and challenges in modeling low-mass galaxies – FLASH seminar, UC Santa Cruz	2019
Successes and challenges in modeling low-mass galaxies – Cosmology seminar, UC Davis	2019
The globular cluster systems of low-mass halos – Lorentz Center workshop, Leiden, Netherlands	2019
Feedback in low-mass galaxies at high redshift – Near/Far workshop, Napa, CA	2018
White dwarf demographics with Gaia – Lunch talk, UC Berkeley	2018
The binary fraction and metallicity – GSPS, UC Berkeley	2018
Dwarf galaxies as laboratories for astrophysics and cosmology – CCAPP Price Prize lecture, Ohio State	2018
Stars re-shaping galaxies – Galactic angular momentum focus group, IAU, Vienna, Austria	2018
Thermal conduction in superbubble evolution – KSPA, CCA, NYC	2018
What can Gaia do for white dwarfs? – Lunch talk, CCA, NYC	2018
The formation and hierarchical assembly of globular clusters – Galaxy coffee, MPIA, Heidelberg	2018
What do globular clusters tell us about the high-redshift universe? – Galaxy lunch, Yale	2018
How to fit a stellar spectrum – GSPS, UC Berkeley	2018
Gas kinematics from unresolved HI data – Lunch talk, UC Berkeley	2018
Globular cluster formation scenarios – Near/Far workshop, Napa, CA	2017
How to find long-period spectroscopic binaries – Lunch talk, UC Berkeley	2017
A self-consistent model for binary star spectra – SFB seminar, ARI, Heidelberg	2017
Effects of stellar feedback on dwarf galaxy evolution – Galaxy coffee, MPIA, Heidelberg	2017

Angular momentum of low-mass halos (poster) – Galaxy-Halo Connection Workshop, KITP 2017
Does the IMF vary in ultrafaint galaxies? – GSPS, UC Berkeley 2017
What regulates disk formation in low-mass galaxies? – Lunch talk, UC Berkeley 2017
Small-scale problems in ΛCDM: feedback to the rescue? – GalForm seminar, UC Berkeley 2017
Dust and the simulated SED – Near/Far Workshop, Santa Rosa, CA 2016
Dynamical modeling of low-mass galaxies – Lunch talk, UC Berkeley 2016
Can baryonic feedback save ΛCDM on small scales? – undergraduate thesis talk, Yale 2016

Publications (57 total; 20 first-author)

h-index: 26 (all papers), 16 (first-author papers)
citations: 1700+ (all papers), 900+ (first-author papers)

57. Rybizki, J, Green, G. M., Rix, H.-W., **El-Badry, K.,** Demleitner, M., Zari, E., Udalski, A., Smart, R., Gould, A., 2021, "A classifier for spurious astrometric solutions in Gaia eDR3", arXiv:2101.11641, MNRAS, submitted.

56. Emami, N., Siana, B., **El-Badry, K.**, Cook, D., Ma, X., Weisz, D., Gharibshah, J., Alaee, S., Scarlata, C., Skillman, E., 2021, "Testing the relationship between bursty star formation and size fluctuations of local dwarf galaxies", arXiv:2108.08857, ApJ, in press.

55. **El-Badry, K.,** Rix, H.-W., Quataert, E., Kupfer, T., Shen, K., 2021, "Birth of the ELMs: a ZTF survey for evolved cataclysmic variables turning into extremely low-mass white dwarfs", arXiv:2108.04255, MNRAS, in press.

54. Moss, A., von Hippel, T., Robinson, E., **El-Badry, K.**, Stenning, D., van Dyk, D., Fouesneau, M., Bailer-Jones, C., Jeffery, E., Sargent, J., Kloc, I., Moticska, N., 2021, "Ages of wide white dwarf - main sequence binaries with Gaia parallaxes and spectroscopic metallicities", ApJ, submitted.

53. Jahn, E. D., Sales, L. V., Wetzel, A., Samuel, J., **El-Badry, K.**, Boylan-Kolchin, M., Bullock, J. S., 2021, "The effects of LMC-mass environments on their dwarf satellite galaxies in the FIRE simulations", arXiv:2106.03861, MNRAS, submitted.

52. Terreran, G., Jacobson-Galan, W. V., Groh, J. H., Margutti, R., Coppejans, D. L., Dimitriadis, G., Kilpatrick, C. D., Matthews, D. J., Siebert, M. R., Angus, C. R., Brink, T. G., Filippenko, A. V., Foley, R. J., Jones, D. O., Tinyanont, S., Gall, C., Pfister, H., Zenati, Y., Ansari, Z., Auchettl, K., **El-Badry, K.**, Magnier, E. A., Zheng, W., 2021, "The early phases of Supernova 2020pni: shock-ionization of the nitrogen-enriched circumstellar material", arXiv:2105.12296, ApJ, submitted.

51. Nelson, T., Ting, Y.-S., Hawkins, K., Ji, A., Kamdar, H., **El-Badry, K.**, 2021, "Distant relatives: The chemical homogeneity of comoving pairs identified in Gaia", arXiv:2104.12883, ApJ, submitted.

50. **El-Badry, K.,** Quataert, E., Rix, H.-W., Weisz, D. R., Kupfer, T., Shen, K., Xiang M., Yang Y., Liu, X., 2021, "LAMOST J0140355+392651: An evolved cataclysmic variable donor transitioning to become an extremely low mass white dwarf", arXiv:2104.07033, MNRAS, 505, 2051.

49. Stern, J., Sternberg, A., Faucher-Giguère, C.-A., Hafen, Z., Fielding, D., Quataert, E., Wetzel, A., Anglès-Alcàzar, D., **El-Badry, K.**, Kereš, D., Hopkins, P. F., 2021, "Neutral CGM as damped Ly absorbers at high redshift", arXiv:2105.06489, MNRAS, submitted.

48. Santistevan, I., Wetzel, A., Sanderson, R., **El-Badry, K.**, Samuel, J., Faucher-Giguère, C.-A., 2021, "The origin of metal-poor stars on prograde disk orbits in FIRE simulations of Milky Way-mass galaxies", arXiv:2102.03369, MNRAS, 505, 921.

47. **El-Badry, K.,** Rix, H.-W., Heintz, T. M., 2021, "A million binaries from Gaia eDR3: sample selection and validation of Gaia parallax uncertainties", arXiv:2101.05282, MNRAS, 506, 2269.

46. Martin, D. V., **El-Badry, K.,** Hodžić, V. K., Triaud, A. H. M. J., Angus, R., Birky, J., Foreman-Mackey, D., Hedges, C., Montet, B., Murphy, S. J., Santerne, A., Stassun, K. G., Stephan A. P., Wang, J., Benni, P., Krushinsky, V., Chazov, N., Mishevskiy, N., Ziegler, C., Soubkiou, A., Benkhaldoun, Z., Caldwell, D. A., Collins, K., Henze, C. E., Guerrero, N. M., Jenkins, J. M., Latham D. W., Levine, A., McDermott, S., Mullally, S. E., Ricker, G., Seager, S., Shporer, A., Vanderburg, A., Vanderspek, R., Winn, J. N., 2021, "TOI-1259Ab – a gas giant with 2.6% deep transits and a bound white dwarf companion", arXiv:2101.02707, MNRAS, in press.

45. Mercado, F. J., Bullock, J. S., Boylan-Kolchin, M., Moreno, J., Wetzel, A., **El-Badry, K.**, Graus, A. S., Fitts, A., Hopkins, P. F., Faucher-Giguère, C.-A., 2020, "Totally metal: A relationship between stellar metallicity gradients and galaxy age in dwarf galaxies", arXiv:2009.01241, MNRAS, 501, 5121.

44. Velázquez, J. F., Gurvich, A. B., Faucher-Giguère, C.-A., Bullock, J. S., Starkenburg, T. K., Moreno, J., Lazar, A., Mercado, F. J., Stern, J., Sparre, M., Hayward, C., Wetzel, A., **El-Badry, K.**, 2020 "The timescales probed by star formation rate indicators for realistic, bursty star formation histories from the FIRE simulations", arXiv:2008.08582, MNRAS, 501, 4812.

43. Xiang, M.-S., Rix, H.-W., Ting, Y.-S., Zari, E., **El-Badry, K.**, Yuan, H.-B., Cui, W.-Y., 2020, "Data-driven spectroscopic estimates of absolute magnitude, distance, and binarity — method and catalog of 16,002 O- and B-type stars from LAMOST", arXiv:2008.10637, ApJS, 253, 22.

42. Irrgang, A., Geier, S., Heber, U., Kupfer, T., **El-Badry, K.**, Bloemen, S., 2020, "A proto-helium white dwarf stripped by a substellar companion via common-envelope ejection: Uncovering the true nature of a candidate hypervelocity B-star", arXiv:2007.03350, A&A., 650, 102.

41. Kamdar, H., Conroy, C., Ting, Y.-S., **El-Badry, K.**, 2020, "Spatial and kinematic clustering of stars in the Galactic disk", arXiv:2007.10990, ApJ, submitted.

40. Stern, J., Faucher-Giguère, C.-A., Fielding, D., Quataert, E., Hafen, Z., Gurvich, A. B., Ma, X., Byrne, L., **El-Badry, K.**, Anglès-Alcàzar, D., Chan, T.-K., Feldmann, R., Kereš, D., Wetzel, A., Murray, N., Hopkins, P. F., 2020, "Virialization of the inner CGM in the FIRE simulations and implications for galaxy discs, star formation and feedback", arXiv: 2006.13976, ApJ, 911, 88.

39. **El-Badry, K.** and Quataert, E., 2020, "A stripped-companion origin for Be stars: clues from the putative black holes HR 6819 and LB-1", arXiv:2006.11974, MNRAS, 502, 3436.

38. Li, F., Rahman, M., Murray, N., Hafen, Z., Faucher-Giguère, C.-A., Stern, J., Hummels, C. B., Hopkins, P. F., **El-Badry, K.**, Kereš, D., 2020, "Probing the CGM of low-redshift dwarf galaxies using FIRE simulations", arXiv:2010.13606, MNRAS, 500, 1038.

37. Lazar, A., Bullock, J. S., Boylan-Kolchin, M., Chan, T.-K., Hopkins, P. F., Graus, A., Wetzel, A., **El-Badry, K.**, Wheeler, C., Straight, M. C., Kereš, D., Faucher-Giguère, C.-A., Fitts, A., Garrison-Kimmel, S., 2020, "A dark matter profile to model diverse feedback-induced core sizes of ΛCDM haloes", arXiv:2004.10817, MNRAS, 497, 2393.

36. Coronado, J., Rix, H.-W., Trick, W., **El-Badry, K.**, Rybizki, J., Xiang, M., 2020, "From birth associations to field stars: mapping the small-scale orbit distribution in the Galactic disc", arXiv:2002.09496, MNRAS, 495, 4098.

35. Santistevan, I. B., Wetzel, A., **El-Badry, K.**, Bland-Hawthorn, J., Boylan-Kolchin, M., Bailin, J., Faucher-Giguère, C.-A., Benincasa, S., 2020, "Growing pains: the formation times and building blocks of Milky Way-mass galaxies in the FIRE simulations", arXiv:2001.03178, MNRAS, 497, 747.

34. Pelliccia, D., Mobasher, B., Darvish, B., Lemaux, B. C., Lubin, L. M., Hirtenstein, J., Shen, L., Wu, P.-F., **El-Badry, K.**, Wetzel, A., Jones, T., 2020, "Effects of stellar feedback on stellar and gas kinematics of star-forming galaxies at $0.6 < z < 1.0$", arXiv:2001.00590, ApJL, 896, 26.

33. **El-Badry, K.** and Quataert, E., 2019, "Not so fast: LB-1 is unlikely to contain a $70\,M_\odot$ black hole", arXiv:1912.04185, MNRASL, 493, 22.

32. Hafen, Z., Faucher-Giguère, C.-A., Anglès-Alcàzar, D., Stern, J., Kereš, D., Esmerian, C., Wetzel, A., **El-Badry, K.**, Chan, T.-K., Murray, N., 2019, "The fates of the circumgalactic medium in the FIRE simulations", arXiv:1910.01123, MNRAS, 494, 3581.

31. Tian, H.-J., **El-Badry, K.**, Rix, H.-W., Gould, A., 2019, "The separation distribution of ultrawide binaries across galactic populations", arXiv:1909.04765, ApJS, 246, 4.

30. Hawkins, K., Lucey, M., Ting, Y.-S., Ji, A., Katzberg, D., Thompson, M., **El-Badry, K.**, Teske, J., Nelson, T., Carrillo, A., 2019, "Identical or fraternal twins?: The chemical homogeneity of wide binaries from *Gaia* DR2", arXiv:1912.08895, MNRAS, 492, 1164.

29. **El-Badry, K.**, Rix, H.-W., Tian, H., Duchêne, G., Moe, M., 2019, "Discovery of an equal-mass "twin" binary population reaching 1000+ AU separations", arXiv:1906.10128, MNRAS, 489, 5822.

28. Jahn, E. D., Sales, L. V., Wetzel, A., Boylan-Kolchin, M., Chan, T.K., **El-Badry, K.**, Lazar, A., Bullock, J. S., 2019, "Dark and luminous satellites of LMC-mass galaxies in the FIRE simulations", MNRAS, 489, 5348.

27. Samuel, J., Wetzel, A., Tollerud, E., Garrison-Kimmel, S., Loebman, S., **El-Badry, K.**, Hopkins, P.F., Boylan-Kolchin, M., Faucher-Giguère, C.-A., Bullock, J., Benincasa, S., Bailin, J., 2019, "A profile in FIRE: resolving the radial distributions of satellite galaxies in the Local Group with simulations", arXiv:1904.11508, MNRAS, 491, 1471

26. Garrison-Kimmel, S., Wetzel, A., Hopkins, P. F., Sanderson, R., **El-Badry, K.**, Graus, A., Chan, T.K., Feldmann, R., Boylan-Kolchin, M., Hayward, C., Bullock, J. S., Fitts, A., Samuel, J., Wheeler, C., Kereš, D., Faucher-Giguère, C.-A., 2019, "Star formation histories of dwarf galaxies in the FIRE simulations: dependence on mass and Local Group environment", arXiv:1903.10515, MNRAS, 489, 4574.

25. **El-Badry, K.**, Ostriker, E. O., Kim, C.-G., Quataert, E., Weisz, D. R., 2019, "Evolution of supernovae-driven superbubbles with conduction and cooling", arXiv:1902.09547, MNRAS, 490, 1961.

24. Dickey, C. M., Geha, M., Wetzel, A., **El-Badry, K.**, 2019, "AGN all the way down? AGN-like line ratios are common in the lowest-mass isolated quiescent galaxies", arXiv:1902.01401, ApJ, 884, 180.

23. Emami, N., Siana, B., Weisz D. R., Johnson, B. D., Ma, X., **El-Badry, K.**, 2018, "A closer look at bursty star formation with $L_{\mathrm{H}\alpha}$ and L_{UV} distributions", arXiv:1809.06380, ApJ, 881, 71.

22. Fitts, A., Boylan-Kolchin, M., Bozek, B., Bullock, J. S., Graus, A., Robles, V., Hopkins P. F., **El-Badry, K.**, Garrison-Kimmel, S., Faucher-Giguère, C.-A., Wetzel, A., Kereš, D., 2018, "Dwarf galaxies in CDM, WDM, and SIDM: disentangling baryons and dark matter physics", arXiv: 1811.11791, MNRAS, 490, 962.

21. Hafen, Z., Faucher-Giguère, C.-A., Anglès-Alcàzar, D., Stern, J., Kereš, D., Hummels, C., Esmerian, C., Garrison-Kimmel, S., **El-Badry, K.**, Wetzel, A., Chan, T. K., Hopkins, P. F., Murray, N., 2018, "The origins of the circumgalactic medium in the FIRE simulations", arXiv:1811.11753, MNRAS, 488, 1.

20. Hirtenstein, J., Jones T., Wang, X., Wetzel, A., **El-Badry, K.**, Hoag, A., Treu, T., Bradač, M., Morishita, T., 2018, "The OSIRIS lens-amplified survey (OLAS) I: dynamical effects of stellar feedback in low mass galaxies at $z \sim 2$", arXiv:1811.11768, ApJ, 880, 54.

19. **El-Badry, K.,** 2019, "The geometric challenge of testing gravity with wide binaries", arXiv:1810.13397, MNRAS, 482, 5018.

18. **El-Badry, K.** and Rix, H.-W., 2019, "The wide binary fraction of solar-type stars: emergence of metallicity dependence at $a < 200$ AU", arXiv:1809.06860, MNRASL, 482, 139.

17. **El-Badry, K.** and Rix, H.-W., 2018, "Imprints of white dwarf recoil in the separation distribution of Gaia wide binaries", arXiv:1807.06011, MNRAS, 480, 4884.

16. Garrison-Kimmel, S., Hopkins, P. F., Wetzel, A., Bullock, J., Boylan-Kolchin, M., Kereš, D., Faucher-Giguère, C.-A., **El-Badry, K.**, Lamberts, A., Quataert, E., Sanderson R. E., 2018, "The Local Group on FIRE: Dwarf galaxy populations across a suite of hydrodynamic simulations", arXiv:1806.04143, MNRAS, 487, 1380.

15. Debattista, V. P., Gonzalez O. A., Sanderson R. E., **El-Badry, K.,** Garrison-Kimmel, S., Wetzel, A., Faucher-Giguère, C.-A., Hopkins, P. F., 2018, "Formation, vertex deviation and age of the Milky Way's bulge: input from a cosmological simulation with a late-forming bar", arXiv:1805.12199, MNRAS, 485, 5073.

14. **El-Badry, K.**, Rix, H.-W., Weisz, D. R. 2018, "An empirical measurement of the initial-final mass relation with Gaia white dwarfs", arXiv:1805.05849, ApJL, 860, 17.

13. **El-Badry, K.**, Quataert, E., Weisz, D. R., Choksi, N., Boylan-Kolchin, M. 2019, "The formation and hierarchical assembly of globular cluster populations", arXiv:1805.03652, MNRAS, 482, 4528.

12. **El-Badry, K.**, Bland-Hawthorn, J., Wetzel, A., Quataert, E., Weisz, D. R., Boylan-Kolchin, M., Hopkins, P. F., Faucher-Giguère, C.-A., Kereš, D., Garrison-Kimmel, S. 2018, "Where are the most ancient stars in the Milky Way?", arXiv:1804.00659, MNRAS, 480, 652.

11. Fitts, A., Boylan-Kolchin, M., Bullock, J., Weisz, D. R., **El-Badry, K.**, Wheeler, C., Faucher-Giguère, C.-A., Quataert, E., Hopkins, P. F., Kereš, D., Wetzel, A., 2018, "No assembly required: mergers are mostly irrelevant for the growth of low-mass dwarf galaxies", arXiv:1801.06187, MNRAS, 479, 319.

10. **El-Badry, K.**, Bradford, J., Quataert, E., Geha, M., Boylan-Kolchin, M., Weisz, D. R., Wetzel, A., Hopkins, P. F., Chan, T. K., Fitts, A., Kereš, D., Faucher-Giguère, C.-A. 2018, "Gas kinematics in FIRE simulated galaxies compared to spatially unresolved HI observations", arXiv:1801.03933, MNRAS, 477, 1536.

9. Garrison-Kimmel, S., Hopkins, P. F., Wetzel, A., **El-Badry, K.**, Sanderson R. E., Bullock, J., Ma, X., van de Voort, F., Hafen, Z., Faucher-Giguère, C.-A., Hayward, C. C., Quataert, E., Kereš, D., Boylan-Kolchin, M., 2018, "The origin of the diverse morphologies and kinematics of Milky Way-mass galaxies in the FIRE-2 simulations", arXiv:1712.03966, MNRAS, 481, 4133.

8. Chan, T. K., Kereš, D., Wetzel, A., Hopkins, P. F., Faucher-Giguère, C.-A., **El-Badry, K.**, Garrison-Kimmel, S., Boylan-Kolchin, M. 2017, "The origin of ultra diffuse galaxies: stellar feedback and quenching", arXiv:1711.04788, MNRAS, 478, 906.

7. **El-Badry, K.**, Ting, Y.-S., Rix, H.-W., Quataert, E., Weisz, D. R., Cargile, P., Conroy, C., Hogg, D. W., Bergemann, M., Liu, C., 2018, "Discovery and characterization of 3000+ main-sequence binaries from APOGEE spectra", arXiv:1711.08793, MNRAS, 476, 528.

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