

University of Florida
Astronomy 7939 Sec. 3574 Spring 2009
“Stellar Populations”
MWF 3:00 – 3:50pm
Professor Ata Sarajedini
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Syllabus

Optional Books: “Evolution of Stars and Stellar Populations” by Salaris & Cassisi
“Star Clusters,” by Carney & Harris
“Globular Cluster Systems” by Ashman & Zepf

Purpose: This course is intended as a survey of various topics in resolved stellar populations. We will discuss both the theoretical and observational aspects of the topic. In all facets of the course, relevant journal articles from the professional literature will be used to augment and extend the topics discussed in lecture. In the process, I hope to introduce you to the scholarly literature in the field and endeavor to teach critical thinking in the evaluation of scientific results.

General Requirements: one in-class presentation, one project, in-class pop quizzes, one final.

Course Web Page: Can be accessed at <http://www.astro.ufl.edu/~ata/>

Grading Breakdown: 10% - class attendance and participation
20% - project
20% - presentation
20% - pop-quizzes
30% - final exam

General Structure: The class will be structured around 10 diagnostic diagrams typically used in the field. These are (1) the HR Diagram (or Color-Magnitude Diagram [CMD]) and its cousin the Luminosity Function (LF), (2) the Metallicity Distribution Function (MDF), (3) the Age-Metallicity Relation (AMR), (4) the Age-Galactocentric Distance Relation, (5) the Metallicity-Galactocentric Distance Relation, (6) the $[\alpha/\text{Fe}]$ vs $[\text{Fe}/\text{H}]$ Relation, (7) the $[\text{Fe}/\text{H}]$ vs Horizontal Branch Morphology Relation, (8) the Bailey Diagram for RR Lyrae variables, (9) the Luminosity Function of Star Clusters, and (10) the Specific Frequency of Globular Clusters (S_N) vs Galaxy Luminosity. We will consider each of these diagrams in turn and read papers (mostly written by the instructor) on these topics. The goal is to understand how each diagram is constructed and how it is to be interpreted.

Office Hours: If you would like to meet with me, please see me to set up a time.

Proposed Schedule of Lectures: As the semester progresses and depending upon class interest, it may become necessary to deviate from this plan.

Weeks 1 and 2: Introduction, the Color-Magnitude Diagram and the Luminosity Function

Readings: Sarajedini & Layden (1995), Sarajedini et al. (1997b), von Hippel & Sarajedini (1998), Sarajedini et al. (1999), Melbourne et al. (2000), Sarajedini (2004), Siegel et al. (2007), Paust et al. (2007), Dotter et al. (2008), Milone et al. (2008)

Week 3: Metallicity Distribution Function

Readings: Da Costa & Armandroff (1990), Sarajedini (1994), Sarajedini & Milone (1995), Saviane et al. (2000), Geisler & Sarajedini (1999), Sarajedini & Van Duyne (2001), Tiede et al. (2004), Sarajedini & Jablonka (2005)

Week 4: Age – Metallicity Relation (AMR)

Readings: Sarajedini (1998), Mighell, Sarajedini, & French (1998), Layden & Sarajedini (2000), Piatti et al. (2007), Siegel et al. (2007)

Week 5: [Fe/H] vs Horizontal Branch Morphology Relation

Readings: Sarajedini & King (1989), Sarajedini & Demarque (1990), Sarajedini & Lederman (1991), Stetson, Vandenberg, & Bolte (1996), Sarajedini, Chaboyer, & Demarque (1997a), Sarajedini et al. (1998), Sarajedini et al. (2000)

Week 6: Metallicity – Galactocentric Distance Relation

Readings: Sarajedini & King (1989), Chaboyer, Sarajedini, & Demarque (1992), Sarajedini, Lee, & Lee (1995), Chaboyer, Demarque, & Sarajedini (1996), Sarajedini et al. (2009)

Week 7: Age – Galactocentric Distance Relation

Readings: Sarajedini & King (1989), Chaboyer, Sarajedini, & Demarque (1992), Chaboyer, Demarque, & Sarajedini (1996), Harbeck et al. (2001)

Week 8: [α /Fe] vs [Fe/H] Relation

Readings: Chiappini et al. (1997)

Week 9: Bailey Diagram for RR Lyrae variables

Readings: Layden & Sarajedini (2000), Brown et al. (2005), Sarajedini et al. (2009)

Week 10: Luminosity Function of Star Clusters

Readings: Student Talks

Week 11: Specific Frequency of Globular Clusters (S_N) vs Galaxy Luminosity

Readings: Student Talks

References:

- Brown, T. et al. 2005, AJ, 127, 2738 (RRL in M31)
- Chaboyer, B., Sarajedini, A., & Demarque, P. 1992, ApJ, 394, 515
- Chaboyer, B., Demarque, P., & Sarajedini, A. 1996, ApJ, 459, 558
- Chiappini et al. 1997, ApJ, 477, 765
- Da Costa, G. S. & Armandroff, T. E. 1990, AJ, 100, 162 (SGBIVI)
- Dotter, A., Sarajedini, A., & Yang, S. –C. 2008, AJ, 136, 1407
- King, C. R., Da Costa, G. S., & Demarque, P. 1985, ApJ, 299, 674 (RGB LF)
- Geisler, D., & Sarajedini, A. 1999, AJ, 117, 308 (SGBITWS)
- Harbeck, D. et al. 2001, AJ, 122, 3092
- Layden, A. C. & Sarajedini, A. 2000, AJ, 119, 1760 (Sgr SFH)
- Melbourne, J. et al. 2000, AJ, 120, 3127 (NGC 4833)
- Mighell, K. et al. 1998, AJ, 116, 2395
- Milone, A. et al. 2008, Memorie della Societa Astronomica Italiana, v.79, p.623
- Paust, N., Chaboyer, B., & Sarajedini, A. 2007, AJ, 133, 2787
- Piatti, A. et al. 2007, MNRAS, 382, 1203
- Sarajedini, A. & King, C. R. 1989, AJ, 98, 1624 (Vertical Method)
- Sarajedini, A. & Demarque, P. 1990, ApJ, 365, 219 (Horizontal Method)
- Sarajedini, A. & Da Costa, G. S. 1991, AJ, 102, 628 (NGC 6101)
- Sarajedini, A. & Lederman, A. 1991, ASPC, 13, 293
- Sarajedini, A. 1992, AJ, 104, 178 (NGC 5897)
- Sarajedini, A. 1994, AJ, 107, 618 (SRM)
- Sarajedini, A. & Norris, J. E. 1994, ApJS, 93, 161 (Metal-Rich)
- Sarajedini, A. & Milone, A. A. E. 1995, AJ, 109, 269 (NGC 5053)
- Sarajedini, A. & Forrester, W. L. 1995, AJ, 109, 1112 (NGC 6584)
- Sarajedini, A. & Layden, A. C. 1995, AJ, 109, 1086 (Sgr)
- Sarajedini, A., Lee, Y. –W., & Lee, D. –H. 1995, ApJ, 450, 712 (Red HB)
- Sarajedini, A., Chaboyer, B., & Demarque, P. 1997a, PASP, 109, 1321 (Review)
- Sarajedini, A., Claver, C. F., & Ostheimer, J. C. 1997b, AJ, 114, 2505 (Antlia)
- Sarajedini, A. 1998, AJ, 116, 738 (LMC Gap Clusters)
- Sarajedini, A. et al. 1998, ApJ, 508, L37 (M33 Clusters)
- Sarajedini, A. et al. 1999, AJ, 118, 2894 (NGC 188 0.9m)
- Sarajedini A. et al. 2000, AJ, 120, 2437 (M33 Clusters)
- Sarajedini, A. & Van Duyne, J. 2001, AJ, 122, 2444 (M31 Thick Disk)
- Sarajedini, A. 2004, AJ, 128, 1228 (Lynga 7)
- Sarajedini, A. & Jablonka, P. 2005, AJ, 130, 1627 (M31 Bulge)
- Sarajedini, A. et al. 2009, AJ, submitted
- Saviane, I. et al. 2000, A&Ap, 355, 966
- Siegel, M. H. et al. 2007, ApJ, 667, L57
- Stetson, P. B., VandenBerg, D., & Bolte, M. 1996, PASP, 108, 560
- Tiede, G. P. et al. 2004, AJ, 128, 224
- von Hippel, T. & Sarajedini, A. 1998, 116, 1789 (NGC 188 WIYN)