**Title: Instructions for Formatting an Article for the JDSO (14pt)**

Author One1, Author Two2, Author Three3 etc (11 pt Times New Roman)
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#### Abstract (11 pt Times New Roman Bold)

(11 pt Times New Roman) The abstract should be concise and one paragraph (not to exceed 300 words). It should be as informative as possible; it should give details of the article, including the conclusions arrived at. Avoid writing a merely descriptive abstract that only tells what the article is about. In other words, the abstract should be a short summary of the article in which you may state the question at issue, the purpose of the study, the procedures followed, and your results, conclusions, or recommendations. References should not be given in the abstract. The abstract should draw a reader into your paper as many people who should see your paper are very busy and won’t take the time for a paper they think is of little or no interest. Examples of how to write the abstract can be found [here](https://docs.google.com/document/d/1W5WI1FqsgXV58t2TfJLiWWOWXHKadHNkoC2Ts061Pic/edit).

#### 1. Introduction (11 pt TNR)

(11 pt TNR) Write an introductory statement that explains why you chose this subject or object for research and give a little of the history of this subject or object. Also you should state the objectives of the research.

#### Body of the manuscript

#### The body of the paper consists of numbered sections that present the main findings. These sections should be organized to best present the material.

#### It is often important to refer back (or forward) to specific sections. Such references are made by indicating the section number, for example, “In Sec. 2 we showed…” or “Section 2.1 contained a description….” If the word Section, Reference, Equation, or Figure starts a sentence, it is spelled out. When occurring in the middle of a sentence, these words are abbreviated Sec., Ref., Eq., and Fig. At the first occurrence of an acronym, spell it out followed by the acronym in parentheses, e.g., charge-coupled device (CCD).

#### 2. Equipment and Methods

#### This section describes the equipment and methodology used for relevant data acquisition. Figures, finder charts, tables, and equations could be presented here. Table titles should be presented *above* the table and in normal font (not italic) as in the example below. Captions should start with a capital letter and end with a period. Fonts for any tables may be made as small as 8 pt in order to fit all the data on a portrait page layout.

Table 1. Calibration stars.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Star | Position | q, year | r, year | Source |
| STF 401 | 03313+2734 | 270 (2012) | 11.1 (2012) | WDS |
| STF 2873 | 21582+8252 | 66 (2012) | 13.7 (2012) | WDS |

Table footnotes are placed directly following the table and are indicated with superscripted symbols, letters, or numerals.

Table titles should appear *above* the table and should not be italicized.



*(11 pt TNR Italic; justified, margins 0.3” from column standard margins0 Figure 1: HR diagram of the luminosity and spectral class of component A, component B, and component C of WDS00115+2949*

#### Captions for figures should go *below* the figure and should be centered. Captions should not end with a period. All images should be in JPG or FITS format.

#### You should present the method for collecting the data. Describe the telescope (type and aperture) and camera system (if used) or measurement device (if mechanical) and the type of measurement (micrometer, micrometric eyepiece, CCD, lucky imaging, speckle interferometry, etc.). Describe how the equipment was calibrated and the results of that calibration. Double stars that are covered by the research should include the WDS number, the Discoverer code and his/her catalog number, and the last reported position angle (q) and separation (r) and the year of that measurement. Magnitudes should be included and the Dmag stated. The number of nights of the observation series (and the dates in Julian format, 2021.xxxx where xxxx is the fractional year based on the day number of the year the night of the observation divided by 365.25) should be stated. An example of a Julian Date would be May 15, 2021. Since May 15 is the 115th day of 2021, the Julian date (JD) would be 2021 + 115/365.25, or 2021.3151.

#### 3. Data

In this section, present the data you collected with your observations. Tables should fit across a portrait page orientation. Landscape tables will not be accepted. (To insert a portrait table that is wider than the column, at the point of insertion, insert a section break and go to single column, then insert your table. After the table, insert a section break and select 2 columns.)

The data table should include the WDS number of the star (e.g., 23218+4226), the Discoverer code (in ALL CAPS) and catalog number (e.g., CHE 36), the magnitudes, the q and r values (q to 1 decimal place, r to two), the year of the reported measurements, and number of measurements of that star, and a reference to any footnotes that would follow the data table. For the arcsecond symbol, use this " symbol (ASCII 2033), not the end quote symbol (”).

The arcsecond symbol is a double apostrophe, not a closed quote mark. This is the arcsecond symbol: ".

In a separate table, report the average measurement, the standard deviation, and the standard error of the mean.

You should also display any images you obtained and display graphs showing the measurements over time on an X-Y coordinate grid. It is suggested to you use the Plot Tool 3.19 (available here) for such plots.

**4. Discussion**

In this section, you will discuss your results in comparison to past history and modern data sources, such as Gaia DR2 and EDR3. If you draw any conclusions about the nature of the system (based on parallax data, proper motion data, radial velocities, and estimated stellar masses), present it here. Cite reasons for concluding a pair may be physical, binary, or optical.

#### 5. Conclusions

#### This section presents the conclusions you reached. This section should outline the main results of the paper and perhaps future directions of research that can be followed. Figures, finding charts, tables and equations in support to the discussion could be presented here. Show how the research achieved the objectives.

#### Acknowledgements

#### In this section, acknowledge any assistance you received from outside sources. The section header does *not* need a period after the section number.

#### In particular, it is requested that you acknowledge assistance from the U. S. Naval Observatory / Washington Double Star Catalog with this tag line: “This research has made use of the Washington Double Star Catalog maintained at the U.S. Naval Observatory.” If you use Gaia, please acknowledge their contribution with this tag line: “This work has made use of data from the European Space Agency (ESA) mission Gaia (https://www.cosmos.esa.int/gaia), processed by the Gaia Data Processing and Analysis Consortium (DPAC, https://www.cosmos.esa.int/web/gaia/dpac/consortium). Funding for the DPAC has been provided by national institutions, in particular the institutions participating in the Gaia Multilateral Agreement.” Be sure to also acknowledge personal or private assistance rendered by teachers, professors, professional astronomers, institutions, and so forth.

#### References

References should follow the format

Author (year) Title. Publication where presented, page numbers. If a URL is available for on-line sources, include the URL. See the examples below. Note that there does not need to be a line break between hanging paragraph references.

Espin, T. E., & Milburn, W. (1927). Micrometrical Measures of Double Stars (21st Series). Monthly Notices of the Royal Astronomical Society, 87(3), 215–225. https://doi.org/10.1093/mnras/87.3.215.

Harshaw, R. (2018). Gaia DR2 and the Washington Double Star Catalog: A tale of two databases. Journal of Double Star Observations , 14(4). Retrieved from http://www.jdso.org/volume14/number4/Harshaw\_734\_740.pdf

Knapp, W. R., & Nanson, J. (2018). Estimating Visual Magnitudes for Wide Double Stars with Missing or Suspect WDS Values. Journal of Double Star Observations, 14(3). Retrieved from http://www.jdso.org/volume

 14/number3/Knapp\_503\_520.pdf