Habitable Zones of Galaxies: Finding Metal-Rich Zones in Various Galaxies and Their Relation to Color

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The habitable zone of a solar system is the range of distances from a star at which water takes a liquid form, therefore supporting life as we know it. This project extends the concept of "habitable zones" to entire galaxies, and it is defined as the range of distances in a galaxy in which there is a sufficient amount of "metals," any element heavier than hydrogen and helium, to create terrestrial planets, which are instrumental to life. To measure metallicity and its correlation to star formation rate (therefore color), galaxies of yellow elliptical and blue spiral type were selected from the MaNGA SDSS database and uploaded into Python code to determine the prominence of certain emission lines, namely [O II], [N II], and Hydrogen-alpha. The brightness of those emission lines were used to determine the metallicity and star formation. According to the results of this project, blue spiral galaxies have more star formation and metallicity than yellow elliptical galaxies, and thus have more habitable zones than elliptical galaxies.

Awards Won:
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