Determining the Classification of SN 2022rze Through Spectral Analysis

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This project aims to understand the nature of SN 2022rze. The event was first classified as a Supernova (SN) based on similarities of its spectral characteristics relating to known and identified supernovae. Even so, the spectroscopic characteristics of the event are similar to those of Active Galactic Nuclei (AGN). In addition, the duration of its light curve argues for an AGN classification. A set of parameters are measured in order to assess whether one of these classifications can be favored. This is done through two types of diagams; a BPT diagram and a diagram showing the Balmer decrements. The BPT diagram shows the relative intensity of the spectral lines for [NII], [OIII], H-alpha, and H-beta. It is used to classify galaxies depending on the region of the diagram in which the data points fall. The Balmer decrements diagram illustrates how the ratio between the spectral lines for H-alpha and H-beta change over time along with particular regions the ratio could fall in and what that means regarding the physical processes that produce the event. The BPT diagram did not bring a definite conclusion, mainly because of the measurements being scattered. On the other side, the Balmer decrements diagram showed that SN 2022rze was not consistent with features of AGN which could speak for a supernova classification. More solid evidence is needed in order to ultimately establish a classification. This is a goal for future studies.

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