AGGIENOVA-Templates

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ARP
Aggie Research Program

Introduction

The Aggienova research team studies exploding stars (supernovae) using data obtained by ground and space-based observatories, including NASA's Swift and Hubble space telescopes. Massive stars go supernovae at the end of their lifetime, and their composition determines the type of explosion that occurs. Aggienova studies different types of supernovae: Type Ia supernovae were once white dwarfs in a binary system and don't exhibit hydrogen emission lines; Type II supernovae are more massive and still retain an outer layer of hydrogen.

Objective

Aggienova Templates is building a pipeline in Python that manipulates supernovae data using a template supernovae spectrum to create more accurate spectrums for data analysis. In addition we have written scripts to update a Swift supernova database used by our pipeline. Examples of these visualization tools include plots of astronomical spectroscopy (a spectrum of electromagnetic radiation) and photometry (the measure of brightness). The programs created by the Aggienova research team are used for the Swift Optical Ultraviolet Supernova Archive (SOUSA). Analyzing the data of supernovae often reveals significant information about progenitor stars of supernovae, such as their chemical composition, temperature, and mass.

New Pipeline Feature
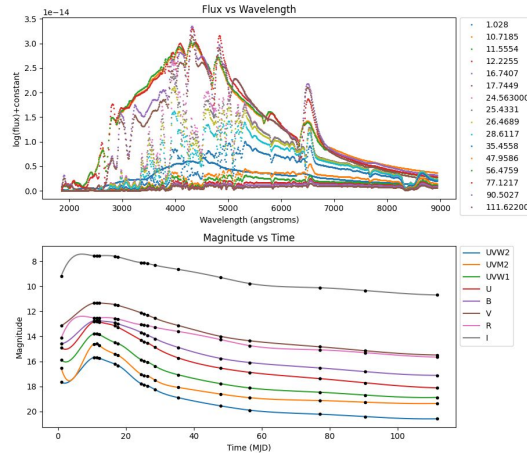
A summary plot feature that visualizes the supernovae mangled data outputted by the pipeline. In this figure, a Flux vs Wavelength plot and Magnitude vs Time plot of the supernovae SN2007af mangled (corrected) with SNII series templates is shown.

Light Curves
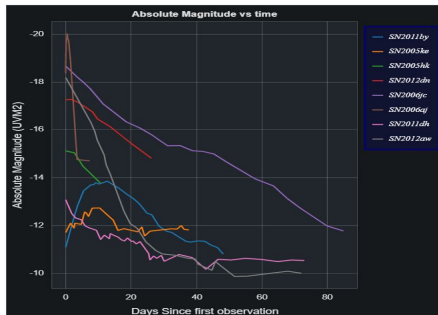
This plot is made in python using Bokeh. It takes a list of supernova names and uses them to search our database for the data necessary to plot various light curves of different supernova.

Database

No.	Supernova	Host Galaxy	Redshift	Type	Image | Plot | Data
	Supernova Name...	Host Galaxy Name...	Redshift...	Supernova Type...	
1	SN2020rlj	WISEA J230109.61+232903.7	0.039761	Ia	
2	SN2020rgz	WISEA J181201.42+514329.2		Ia	
3	SN2020qic			Ia	
4	SN2020pst	UGC 768 NOTES01	0.046035	Ia	
5	SN2020pjj			Ia-pec	
6	SN2020uta	NGC 6065	0.033953	Ia-91bg-like	
7	SN2020nxt			Ibn	
8	SN2020avb	NGC 4457	0.002942	Ia	
346	SN2016hht ASASSN-16lx	IC 607	0.018596	Ia	
348	SN2016gxp	NGC 51	0.017849	Ia-pec	
349	SN2016hgm	NGC 493	0.007799	II	
350	SN2016gsb ASASSN-16kz	ESO 555-G29	0.00965	Ia	
351	SN2016gkg ATLAS16cvu	NGC 613	0.00494	II	
352	OGLE16dmu			SLSN-I	

The Swift Supernovae Database is a list of supernovae observed by swift along with Swift Ultraviolet/Optical Telescope (UVOT), light curves, and data (where available). In addition, the Database also contains Host Galaxy Name, Redshift, and Supernovae Type (where available). As well as a dynamic search filter for these data types to improve navigation of the Database.

Aggienova Website

The Aggienova website serves as a central hub for aggienova project updates and connecting other online projects such as the Swift Supernovae Database.