AGE OF THE UNIVERSE , CALCULATION AND CONFIRMATION OF COSMIC DATA

Ghazal Attari, Farzanegan 4 High School,Karaj /Iran, Ghazalattari1386@gmail.Com

ABSTRACT

Astronomy is a kind of knowledge which is so wonderful for anybody even for non-expertise individuals. Especially if anyone is interested in astronomy, can have a role in this science development. To know the age of Earth we have used spectroscopy method in 12 galaxies as a sample and by using VIREO Virtual Observatory, first we tried to calculate their velocities away from ourselves and then measured the Hubble constant by estimating the distance of these galaxies of course in this way the spectral parallax method was used. Finally, by reversing it and performing a series of single transformations, we get the age of the universe.

Keywords : *Hubble law, VIREO Virtual Observatory, Spectrum, Galaxy, Age of the Universe*

1. Introduction

New cosmology began with Hubble observations the Hubble value, $h_0 \sim 5.3$, obtained by first observations while many current observations indicated, $0.5 \leq h_0 \leq 1$, but the question is here that how these obvious changing occurred during 6 months? So, we can realize that there are still some errors about real amount of these new and important cosmological parameters. Therefore, with using a combination of x ray's signals effect and Sunyaev-Zel'dovich (SZ) we use a large, galaxy cluster dynamically calms by Chandara, Planck and Blockham Observatory.This is the first analysis data related to axis before the overall accuracy of x-ray temperature measurements are marginalized.

While our limitations to the quietest and most systematic clusters minimize physical astrology and for a fixed cosmological model with:

$$H_0 = 67.3 + . \quad \Omega\Lambda = 0.7 , \Omega m = 0.3$$

we have to find 21.3-13.3 Km / s Megaparsec which is limited by Temperature calibration uncertainty. We discuss the prospects for reducing the prevailing systematic constraint on this analysis and by x-ray calibration or accurate measurement of the relative (SZ) effect it provides an acceptable path for H_0 level constraints (GT, Van et al., January 2012).

In this task we suggest a kind of independent method and non-local cosmological model to limit Fixed Hubble which has been inspired by H0-independent, quasi-cosmopolitan features of the Hubble Modified HIIGx HII galaxy, defined by Jenny T. Wan al et (2016) and they could analysis it with Hubble diagram from the type of SN Ia (Ia) supernova to obtain an inference from the Fixed Hubble. It is shown as:

$H_0 = 71 \pm 20$ Km / s Megaparsec and this method used by other Hubble diagram in upper red shift but it expands unreal H0 results. (Jian-Chen Zhang et al. January 2021) also we can provide a measurement H0 fixed Hubble from the oscillation distance of the SBF surface brightness for 63 bright galaxies, mostly of the primary type up to 100 megapixels observed with the sub-channel in the Hubble Space Telescope .HST distances reach the Hubble Current, and most galaxies are in the 80-50 MPa range but the average statistical uncertainty in individual measurements is 4% for this reason we have made IR SBF Hubble diagrams by these distances and H0 will be limited by these 3 different galaxy velocity treatments.

We limit H_0 using three different galaxy velocity treatments. From the average weight of white calibration (TRGB)we can obtain $H_0 = 73.3 \pm 0.7.2.4$ Km/s Megaparsec, because it reflects some error bars related to statistical uncertain and systematic.

This kind of result is in good agreement with recent H0 measurements of type Ia supernovae with time delays in lens quasars multiplied and reservoirs are compatible (John P. Blakeslee et al January 2021) we attempt to use some VIREO data and important H0 Parameters to calculate the age of the universe.

2. The Importance and Necessity of this Research

In order to provide a compatible model with description of the universe first we should know the age of this universe then we can find some parameters related to age of universe of course some parameters in this field are as follows:

- Rate with the melody of the universe
- The abundance of cosmic elements and the nucleation cycle

The compatibility of cosmological models with the age of the universe is measured, while the age of the universe should be compatible with the age of the components within the universe and not less than that for example, we have a set of observations related to some physical astronomical performances that are older than the age of the universe based on cosmological methods, and for this reason we say this is an inconsistency. In this regard, some cosmological models attempt to remove this inconsistency but in overall we believe that if we have no idea about the real and exact age of this universe, thus we cannot make a consistent model to describe the universe.

In fact, based on Friedmann's equations, the age of the universe is related to the rate of expansion and the densities of matter and energy, it can also limit the frequency and constituent content of the universe. So, the main propose of this research:

- to measure Fixed Hubble based on virtual observatory data
- to calculate the age of universe

and also, Questions with research hypotheses are:
1)   Is the amount of Fixed Hubble exact?
2)   Is the age of the universe compatible with the age of its components?
3)   Are the models presented in the description or geometry of the universe compatible with the age of the universe?

3. Background Knowledge

First, the measurement of the velocity of a galaxy used by Wesno Slyfer in 1912/1291, and next decades was followed more fundamentally by Adville Hubble. In 1929/1308, the first one who measured the distance between galaxies was Adobe Hubble when he plotted these distances at the speed of each galaxy, he could achieve something unusual. When we go farther away from the Milky Way galaxy, the faster it gets away. But there is a question that is there anything special about our place in the universe that makes us a center of cosmic repulsion?

Of course, it was a significant discovery and it was believed that this expansion today is the result of a huge explosion that occurred between 10 and 20 billion years ago.

In a project by (John P. Blakeslee al et. January 2021) SBE method was introduced. This method measures the spatial difference with small-scale oscillations in the polarity of the pixel intensity of the image for the discrete nature of stars consisting of a galaxy then finally, they can collect a large sample of high-quality distances that have a coma cluster in a relatively moderate amount of time.

4. Research Method

Given this current article to obtain the age of the universe using virtual observatory data it is able to discover the facts and realities of the world of creation, therefore, for the nature of the subject, the method of this research is descriptive and fundamental type.

4.1.   Population

The statistical population of this study is the spectrum of the hydrogen line and the calcium line in the 12 known astronomical galaxies (the names of the galaxies are numbered in the astronomical culture) which placed in well-known 12 galaxies (in this case the hydrogen and calcium lines have been studied statistically) (Fig. 1).

4.2.   Measurement Tools for VIREO Data Analysis

The virtual observatory provides access to a variety of data analysis tools that can be used to view and analyze data collected by telescopes and various instruments.
These include spreadsheets and image processing programs that can be specified in user settings and called from the VIREO program. VIREO also contains several programs for analyzing and displaying its specific data. Using the TOOLS option in the menu bar, they are easily accessible through the virtual observatory control panel.
VIREO tools option includes: Spectral classification tool, displays stored spectra and makes them available for comparison to standard spectral atlases.

Spectrum Measuring Tool: Includes stored spectra that allow users to measure wavelength and intensity.
Radio Pulsar Analysis: indicates the recording of signals from a maximum of three VIREO radio receivers and allows users to measure the input time and power of the input pulses.

HR Diagram Analysis: Displays metering data for star clusters and enables the user to measure the distance

between redness and cluster age.

Fig. 1: The statistical population

4.2.1.   Measurement the Spectrum of Galaxies with VIREO

After installing the program, we follow the following steps in order to select a desired galaxy (Fig. 2):

Login - File - entering your favorite name

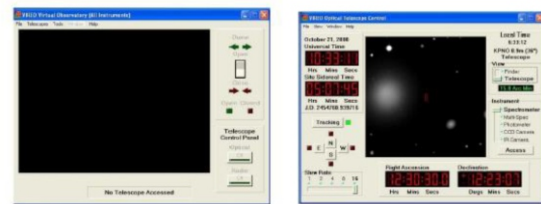Run Exercise – The Hubble Redshift- Distance Relation

Fig. 2: Steps to select a desired galaxy

Due to our study which is about the estimating the age of the universe, we choose the transition to Hubble red, next we choose our telescope. From the three available options, we have to select a telescope with an aperture of 1 meter and then press the open key to open the aperture of the telescope.

We can see the sky from a telescope, Now, we have to select the object with the galaxy we want so that the telescope orifice is in front of it.

A) with turning on the tracking button always causes the telescope to move with the desired mass so that it does not come out of the telescope aperture.

B) Then by selecting the slew option and the Observation Hot List, which is one of the 13 available galaxies we have to be patient till the telescope starts its rotation and focused on the object.

(Note: of course, in this current study, all work steps have been done for 12 galaxies)

A) selecting Telescope option from View part
B) selecting ACCESS option

Now a window based on the figure opens in front of us. When we press the Go button, the light of the desired galaxy enters the telescope for the desired time and draws its spectral diagram.

(Note: In this research, the diagrams are drawn in a time interval of 3 minutes)

Save the drawn page and select the spectrum measuring option from the main window menu and re-read the saved chart file that we drew.

eventually We read the wavelength λ line of the element calcium and hydrogen from the graph and put it in the corresponding table and perform the calculations.

5. Descriptive Data Analysis

In this case we say the wavelength obtained is for

Hydrogen line (based on diagrams) and we have to reduce the amount in the laboratory in this way the difference of Wavelength of the element hydrogen obtained and same factor is used for calcium to indicate the difference of wavelength for the element of calcium then based on the following Equitation some amount obtained by this method shown in the related tables.

1) obtaining this amount and the difference of wavelength is following:

$\Delta\lambda_H = \lambda\ obtained - \lambda\ laboratory$ for hydrogen line
$\Delta\lambda_K = \lambda\ obtained - \lambda\ laboratory$ for calcium line

- The laboratory wavelength of the K calcium line is equal A3933.7
- The laboratory wavelength of the H calcium line is equal A3968.5

2) Obtaining speed of galaxy

$V_H = C \times \frac{\Delta\lambda_H}{\lambda_H}$ the speed of galaxy based on hydrogen line data

$V_K = C \times \frac{\Delta\lambda_K}{\lambda_K}$ the speed of galaxy based on calcium line data

3) obtaining average speed: For each galaxy, add the velocities from the calcium line and the hydrogen line and divide by 2 to obtain the average speed of galaxy then we show it as V avr.

4) obtaining the amount of Fixed Hubble: We put the average velocity number obtained from the previous step in Hubble's law. by this method we can get the Fixed Hubble as following below:

H=V/D

NOTE: in this relation the amount of D which should be galaxy distance we don't have it but in this particular case we have to use of Spectral parallax equation which means:

$m - M = 5 log d - 5$
$log D = \frac{m-M+5}{5}$

Symbol M: is the absolute magnitude of the galaxy, which in this study is considered to be 22.
Symbol m: is the apparent magnitude of the galaxy, the value of which is specified in the plots (Table 1).

Table 1: Fixed Hubble value for 12 Galaxies

H	D(pc)	logD	m	V_{avr}	V_b	V_R	Name of the galaxy	
45.10	331.33	8.52	15.60	14937.1	14792.94	15081.26	36747	1
49.27	363.07	8.48	15.80	14621.41	14690.74	14552.09	36773	2
49.25	301.99	7.98	15.40	14875.76	15199.43	14552.09	36805	3
73.60	95.49	7.9	12.90	7028.78	7140.60	6916.97	NGC4874	4
82.58	79.43	8.98	12.50	6559.95	6505.32	6614.58	NGC4889	5
40.81	954.99	8.6	17.90	38981.26	38917.55	39044.97	51976	6
52.42	398.10	8.78	16.90	20872.19	20766.70	20977.69	54876	7
39.30	602.55	8.66	16.30	23681.59	23588.47	2203.03	54875	9
48.35	457.08	8.22	14.10	22100.32	22164.62	11628.82	54891	10
58.32	165.95	8.34	14.70	12760.64	11767.54	12813.40	NGC7499	11
69.56	218.77	2.28	14.40	13254.57	12707.88	13216.32	NGC7503	12

$\Delta\lambda_K$	$\Delta\lambda_H$	λ_K	λ_H	Name of the galaxy	
193.97	199.5	4127.67	4168.00	36747	1
192.63	192.5	4126.33	4161.00	36773	2
199.3	192.5	4133.00	4161.00	36805	3
93.63	91.5	4027.33	4060.00	NGC4874	4
85.3	87.5	4019.00	4056.00	NGC4889	5
510.3	516.5	4444.00	4485.00	51976	6
272.3	277.5	4206.00	4246.00	54876	7
309.3	314.5	4243.00	4283.00	54875	8
290.63	291.5	4224.33	4260.00	5491	9
154.3	153.83	4088.00	4122.33	NGC7499	10
166.63	169.5	4100.33	4138.00	NGC7501	11
174.3	174.83	4108.00	4143.33	NGC7503	12

6. Discussion and Conclusions

From the values obtained for the fixed Hubble in Table (1), we take the average to consider a certain value for the Hubble constant. The average = H obtained for 12 galaxies based on the description of the measurement and the expansion of the universe / return to the big bang, if we invert the number obtained for the Hubble constant, the age of the agent is obtained, i.e.:

$H = 55.8375\ ,\ 1\ km = 3.2407792 \times 10^{-20} S$

$\rightarrow H = 180.95700858 \times 10^{-20} \frac{1}{s}$

$\frac{1}{H} = age\ of\ universe\ ^{SMpc}/_{Km}$
age of universe $= 0.0055261745 \times 10^{-20} s$

From the dividing this number by the light year in kilometers gives the value of 13.08, which is equal to the age of the universe. Therefore, the age of our universe is 13.08 billion years.

Reference
[1] Narlikar, Gianni Vishnu, 2009 Introduction to Cosmology,

[2] Ingleb, Mike, 2013 Astrophysics for Observers

[3] Redpi, Jan, 2012 Star and Space Atlas,

[4] Kolb, Peter 1394 Cosmology

[5] Gregory, Zilik 1396 Basic Astronomy and Astrophysics Volumes 1 and 2

[6] Croatia, Lavarteb 1396 Jahani e Nish

[7] Mansouri, Reza, 2007 Textbook on Cosmology

[8] VIDEO Virtual Observatory Guide.

[9] Authentic Internet shadows, including the Big Bang