The First Estimation of the Contamination for Galaxy Surveys from Invading UFOs

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Abstract

Of course, this paper is unrealistic but this study is the first attempt!! In this paper, I construct the spectral energy distribution(SED) models of UFOs, based on the spectrum of quasi-white LED. I calculate the photometric redshifts(photo-z). As a result, I obtain the non-zero photo-z. This means that UFOs camouflages in the galaxies!! In conclusion, I got the plausible results but there is a need for the further discussions before this is accepted by the science society.

I wrote a lot of things, but it does not matter (No, it is a problem). Have a lot of fun!!

NOT ACCEPTED

by science society

FAKE

1 Introduction

Recently, huge galaxy surveys have been planed and done. In such a huge survey, we need the method to simultaneously measure redshifts of observed galaxies. Therefore, we use the photometric redshifts estimation (photo-z) method [1, 2]. The photo-z method is certainly used for next-generation surveys [3]. To improve the photo-z method, it is important to evaluate the contamination for photo-z.

Unidentified flying objects (UFOs) are certainly most exciting objects in the Universe. Although, there is no scientific evidences, its existence is like a coin flip (in this case, the probability of the coin coming up heads should not be 50%!!!). What would you do if it exists? Rather, I want it to exist.

Its existence has not been confirmed despite of various observations. According to this fact, they are hiding or camouflaging if they are around the Earth. Their behavior means that they plan to invade the Earth. Hiding UFOs have no effects on a science society because it is not seen (of course, it is a huge problem for human society). However, camouflaging UFOs affect on many space observations. In this paper, I assume the invading UFOs which camouflage in the galaxies and estimate the contamination for photo-z from them.

In Section 2, I construct the two models of the spectral energy distribution(SED) of UFOs. In Section 3, I estimate the observed magnitude of each bands. In Section 4, I show the estimated photometric redshifts. Finally, I conclude in Section 5.

2 Modeling SED of UFOs

In this section, I construct the SED models of invading UFOs. In this paper, I consider the following two models.

2.1 MODEL I: QLED UFOs

Now, I assume a UFO with invaders trying to invade the Earth, so it is expected that their visible light range is similar to ours. Therefore, it is likely that they have developed a Light Emitting Diode (LED) and mainly used them as the lightning devices. According to this assumption, I construct the SED model of UFOs based on the SED of LED. Quasi-White-LED (hereafter, QLED) is constructed by a blue LED and yellow phosphor [4]. Such spectra can be approximated as the sum of two gaussian functions.

$$SED_1(\lambda) = \frac{1}{\sqrt{2\pi {b_1}^2}} \exp\left(-\frac{(\lambda - a_1)^2}{2{b_1}^2}\right) \quad . \tag{2.1}$$

$$SED_2(\lambda) = \frac{1}{\sqrt{2\pi {b_2}^2}} \exp\left(-\frac{(\lambda - a_2)^2}{2{b_2}^2}\right) \quad . \tag{2.2}$$

In this case, SED_1 and SED_2 correspond to SEDs of a blue LED and yellow phosphor respectively. a_1, a_2, b_1 and b_2 are constant. a_1 corresponds to the wavelength of the SED peak position of a blue LED. It is about $460 \sim 470$nm. On the other hand, $a_2 = 570 \sim 580$nm and this is corresponds to the peak wavelength of SED induced by the yellow phosphor. The total SED is the sum of SED_1 and SED_2 but they are weighted by outfactor as follows,

$$SED_{total} = \text{outfactor} \times SED_1 + (1 - \text{outfactor}) \times SED_2 \ . \tag{2.3}$$

In this paper, I have fixed the parameters for simplicity and it is shown in Table1. In Figure 1, I show the SED of the assumed QLED UFOs.

a_1	b_1	a_2	b_2	outfactor
4600 Å	150	5700 Å	1000	1/5

Table 1: The value of the parameters of MODEL I.

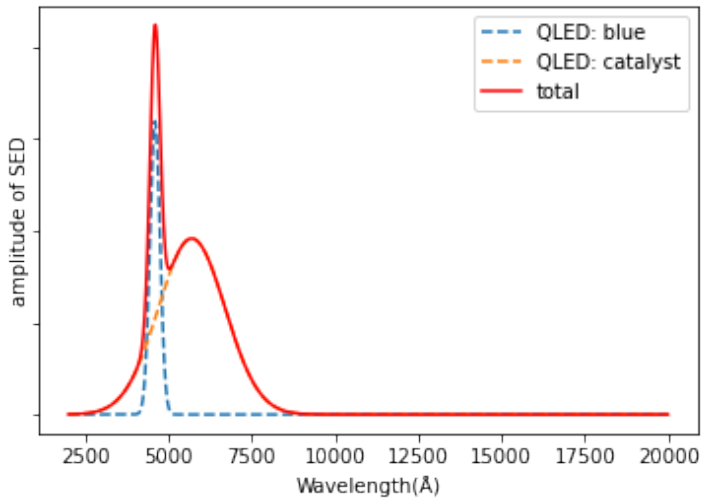

Figure 1: The SED induced a blue LED(blue dashed line) and the SED induced by a yellow phosphor(orange dashed line). The total SED is shown by the red solid line. The model parameters is fixed to the values shown in Table1.

2.2 MODEL II: QLED + Black Body UFOs

According to Figure 1, there are no signal at the ranges of wavelength larger than 9000Å. However, the SED of galaxies has a signal in this wavelength. In addition to Eq.(2.1) and (2.2), I assume the SED like a black-body(hereafter, BB) spectrum at larger wavelength. BB spectrum can be expressed as,

$$SED_{BB} = \mathrm{c} \times \frac{1}{\lambda^5} \frac{1}{\exp\left(\frac{\mathrm{d}}{\lambda}\right) - 1} \quad . \tag{2.4}$$

The peak wavelength of a black body SED, λ_{peak} is about d/4.97 . In this paper, I treat c in Eq(2.4) as the parameter. The total SED can be written as $SED_{total} + SED_{BB}$. Similar to the previous model, I fix the model parameters for simplicity and show them in Table2. In Figure2, I show this SED. It can be seen that there are the signal on larger wavelength compared to the simple QLED model.

a_1	b_1	a_2	b_2	outfactor	c	d
4600 Å	150	5700 Å	1000	1/3	0.005	4.97×700 nm

Table 2: The value of the parameters of MODEL II.

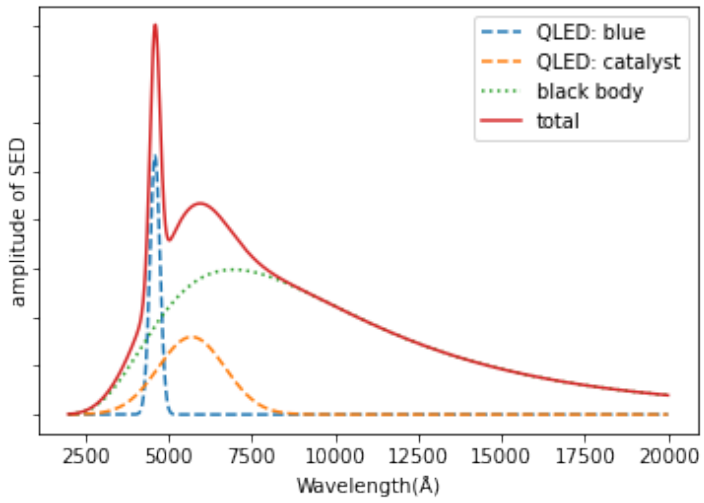

Figure 2: The SED induced a blue LED(blue dashed line) and the SED induced by a yellow phosphor(orange dashed line). The green dashed-dotted line shows the SED of a black body. The total SED is shown by the red solid line.

3 Photo-z Method

In the previous section, I constructed the SED of a UFO. Therefore, I can estimate the observed magnitude of a UFO with this SED. In this paper, I assume the broad-band filters shown in Figure 3. By combining the assumed filters and SED, I estimate the observed magnitude of the each bands. It is shown in Table 3.

I use BPZ (Bayesian Photometric Redshifts) to calculate the photometric redshifts [5–7].

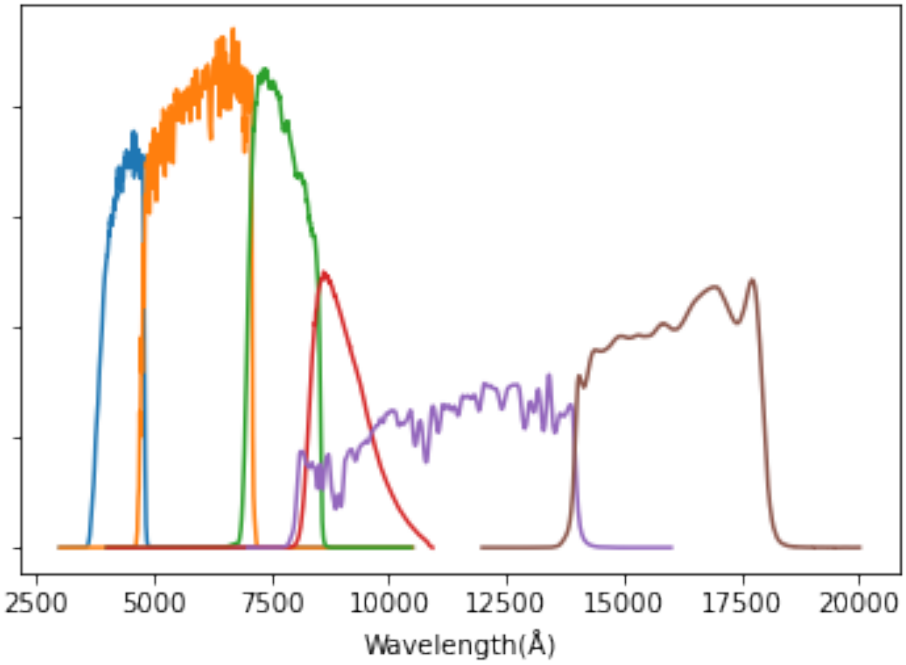

Figure 3: The transmission function of the filters.

model	B	V	i	z	J	H
MODEL I	24.530	23.844	26.099	30.115	30.267	60.590
MODEL II	24.700	23.849	24.672	25.774	25.292	25.886

Table 3: The expected magnitude of the each bands.

4 Results and Discussions

As a result, I have obtained $z_{\rm photo,mod\,I} = 0.091^{+9.651}_{-0.091}$ and $z_{\rm photo,mod\,II} = 0.412^{+138}_{-0.138}$. In Figure 4, I plot the results. The black line shows the $z = z_{\rm photo}$. If the data points are calculated from galaxy samples, the points ideally locate on this line. In fact, the green points which is obtained by the galaxy samples locate on this line. On the other hand, the blue point for MODEL I and the red point for MODEL II do not locate on this line.

In the case of MODEL I, the best-fit point shows the slightly larger photo-z, but the error-bar is very large, so I can not say anything. If you ask me, I will say "the error-bar is too large". Therefore, it is expected that we can understand something strange. On the other hand, the best-fit point of MODEL II shows $z_{\rm photo} \sim 0.4$ and the error-bar is as large as those of the galaxy samples. This means the MODEL II UFOs around the Earth appear as the galaxies at z $\sim$ 0.4.

χ^2 of MODEL I ($\sim$ 11200) and MODEL II ($\sim$ 2000) are worse compared to that of the galaxy samples($\sim 0.1 - 50$). Therefore, I conclude that such a huge photo-z error shows the existence of UFOs.

!!!Although this result is plausible, we need further discussions before this result is accepted by the science society.!!!

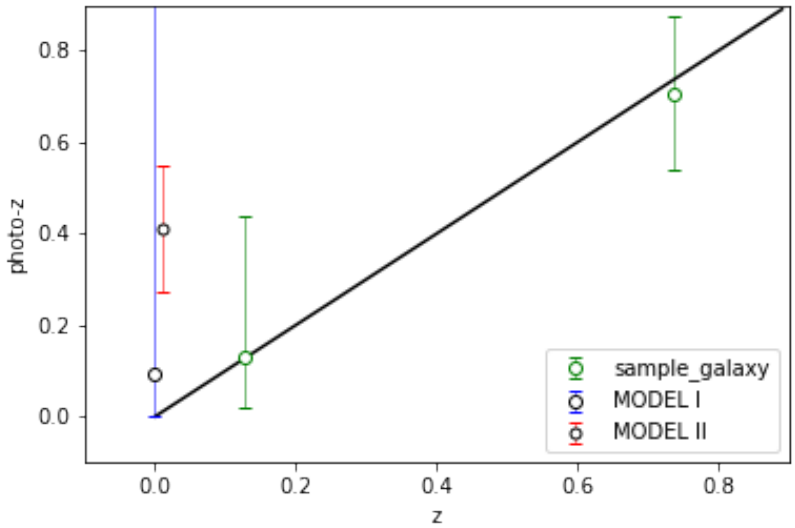

Figure 4: The fitting results. The x-axis is the real redshift and the y-axis is the photo-z. The green points shows the real galaxies. The blue point and red point with the error-bars are the photo-z of MODEL I and MODEL II. z is fixed to 0.00 and 0.01 for MODEL I and MODEL II for clarity in this figure.

5 Conclusion

This study is the first attempt to investigate the influence of UFOs on the cosmology. I constructed the two SED models of UFOs based on the spectra of quasi-white LED. After that, I calculated the photo-z. As a result, I obtained $z_{\mathrm{photo,mod\,I}} = 0.091^{+9.651}_{-0.091}$ and $z_{\mathrm{photo,mod\,II}} = 0.412^{+138}_{-0.138}$. The first one shows large redshifts range. This means the fitting can not be done well. On the other hand, the redshift range of the second one is similar to that of the galaxy samples. It can be said that the UFOs camouflage in the galaxies around $z \sim 0.4$. Therefore, I conclude that it shows the crisis of humanity if we observe many galaxies around $z \sim 0.4$!! This result is very useful from the perspective of the Earth defense.

As I mentioned in the previous section, we need the further discussions because this result is incomplete. Furthermore, many interesting and exciting topics might be remained in this research field because the field of UFO study is infant. Let's enjoy!!!

6 Acknowledgement

I thank you for reading this paper. I dedicate this crazy attempt to my dog. His name is "Kai". I respect his life style and this attempt seems to symbolize it.

I am planing to study other FAKE science. See you again!!

References

[1] Tanaka et al., *Photometric redshifts for Hyper Suprime-Cam Subaru Strategic Program Data Release 1*, *Publications of the Astronomical Society of Japan* **70** (10, 2017) S9, [https://academic.oup.com/pasj/article-pdf/70/SP1/S9/54674988/pasj_70_sp1_s9.pdf].

[2] Sánchez et al., *Photometric redshift analysis in the Dark Energy Survey Science Verification data*, MNRAS **445** (Dec., 2014) 1482–1506, [arXiv:1406.4407].

[3] J. A. Newman and D. Gruen, *Photometric Redshifts for Next-Generation Surveys*, ARA&A **60** (Aug., 2022) 363–414, [arXiv:2206.13633].

[4] mycraft, *LED ligh emitting principle (structure and mechanism)*, . https://www.my-craft.jp/html/aboutled/led_genri.html.

[5] Benítez and Narciso, *Bayesian Photometric Redshift Estimation*, ApJ **536** (June, 2000) 571–583, [astro-ph/9811189].

[6] Benítez et al., *Faint Galaxies in Deep Advanced Camera for Surveys Observations*, ApJS **150** (Jan., 2004) 1–18, [astro-ph/0309077].

[7] D. Coe, N. Benítez, S. F. Sánchez, M. Jee, R. Bouwens, and H. Ford, *Galaxies in the Hubble Ultra Deep Field. I. Detection, Multiband Photometry, Photometric Redshifts, and Morphology*, AJ **132** (Aug., 2006) 926–959, [astro-ph/0605262].