Review of: "A Robust Assessment of the Local Anisotropy of the Hubble Constant"

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Potential competing interests: No potential competing interests to declare.

Before comments, I must say that I know Y.-H. Sanejouand. I had the opportunity to discuss with him in the development of his ideas and of the present paper. Nevertheless, I try to give my report without preconceived judgment. I communicated some tiny remarks about some English expressions to the author. My English is far from perfect, and I cannot say that I am right. So I will concentrate on the meaning of the paper.

The sample (supernovae Ia of the Pantheon+ sample) used by the author is one of the best today. From an older sample, I confirm the fiducial absolute magnitude of -19.25 used in Eq.2 (contrarily to what I said to him in a private discussion).

I appreciated the presentation of the different cosmological models, divided into two general classes: Friedmann-Lemaitre models and Tired-light models. This is very useful to appreciate the differences between them.

Some years ago, the tired-light models were rejected because of the success of the standard model (ΛCDM). Today, we know that this standard model seems to have come to a deadlock (called dark matter and dark energy). The author contributed to giving a new life to tired-light models. He cites many outstanding physicists who believed in this model. Incidentally, I work on a model that has a similarity with tired-light models, and it leads me to the conviction that the drawbacks of the ΛCDM model can be overcome. This is why the new approach by the author seems perfectly justified to my point of view.

I verified the calculation of the new non-conservative tired-light model (ncTL). It was clear.

I retrieved the expression of the luminous distance d_L, but I needed a hypothesis to explain the factor 3/2. Anyway, the result sounds correct.

Then, the author analyzes the anisotropy. With the full sample (including the low-redshift data), the author tunes the value of the Hubble-Lemaître constant, H_0, to get the best chi-2 measuring the behavior of the weighted magnitude residuals. The result is obvious from Table 1 and Figure 2. Two points emerged:

1) The chi2 increases drastically and systematically below z=0.035

2) The best models are the ΛCDM model and the new ncTL model made by the author.

Then, if I have correctly interpreted the paper, the author shows that only a part of the low-redshift sample is responsible for inconsistent behavior. The most interesting fact is that if one rejects the low-redshift sample located in a well-defined

direction (30° above the direction of the CMB dipole), all theoretical predictions become consistent. These results are coherent with the claim that there is anisotropy of the Hubble law.

This situation resembles the one we encountered with my colleagues in a study of the velocity infall of the local group towards Virgo (ref 22 in the present paper and in Ekholm 1999a cited in ref 22). This could suggest that the anomaly observed at low redshift (Fig.2) comes from a structure in the opposite direction of that mentioned above.

My last comment will concern the value of H_0. I am convinced that the sample leads to a value of 74 (km/s)/Mpc, but that the true value is smaller. This is a consequence of the incompleteness of the sample. Nevertheless, we must work with the available data and accept that value.