

Review of: "Planetary relationship as a key signature from the dark sector"

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The work carried out by the authors appears to be too brief and lacking in rigor. The alleged relationship between the number of sunspots and the Mars-Earth synod seems poorly substantiated. Below, I list some important aspects to consider:

1. The authors do not provide sufficient information about the sample. How was this sample obtained? What is the minimum size to define a sunspot? Has this minimum size remained the same as it was 116 years ago? Has the technology for identifying sunspots not evolved over time? Have considerations regarding sunspot size and observation technology been taken into account to ensure the sample is not biased?
2. The graph (Figure 1) that underpins the entire research is not adequately discussed or explained. For example, they mention the "statistical significance of the peaks as a function of sigma" but do not mention anything about the probability distribution or the reference parameter they are using to claim that the peaks in the data distribution are above 5 sigma.
3. I do not have the original data, and I do not know if its distribution is normal (Gaussian), but from Figure 1, one can roughly estimate the number of sunspots for each Earth-Mars synod (see supplementary data). With data obtained in this manner, a non-parametric test can be quickly applied to find any underlying trend. For example, the Run Test can be used considering the median (or mean) of the sample. Applying the Run Test, it is found that, at a 99% confidence level, there is no underlying trend in the data, meaning it can be stated, with 99% confidence, that the distribution of the number of sunspots (according to Figure 1) is random.
4. If the distribution of the number of sunspots shown in Figure 1 were normal, we could calculate its mean and standard deviation and perform a dispersion analysis. A quick calculation shows that the mean is approximately 71,500, and the standard deviation is approximately 4,000 (see supplementary data). From this, it can be seen that all peaks (except one) are within 1.2 sigma. The largest peak (far right of the graph) is within approximately 2.6 sigma. So, these results are no significant.
5. If a particular configuration of two planets played a significant role in the presence of sunspots, then a configuration involving more planets would have a greater effect. Over the 116-year period, there must have been specific planetary configurations involving more planets; however, the distribution of number of sunspots over the 116 years analyzed in Figure 1 is completely random, so no larger planetary configuration had any effect.
6. Even if Figure 1 were to show some underlying trend, such a trend would not necessarily imply a causal relationship between the variables. For example, we could find a relationship between the average height of people in 20 different

European countries and the gross domestic product (GDP) of 20 Latin American countries. This artificially paired relationship obviously is not causal; the fact that a European country has taller or shorter people has nothing to do with the GDP of a completely unrelated country.

7. Speculating about dark matter based on a nonexistent or poorly substantiated phenomenon is not appropriate.