

The Truth about the Strange Non-Chaotic Stars

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Abstract: Within the Scale-Symmetric Theory we showed that the structure of proton leads to the Theory of Chaos and that, due to the gluon-photon transition, such structure leaks from protons. We proved that the structure of the non-chaotic star KIC 5520878 mimics the internal structure of the core of baryons. The more precise observations should show that the ratio of the two principal frequencies for KIC 5520878 is 1.5711 (the today observations lead to 1.57) and that the ratio has nothing with the golden ratio 1.618.... Moreover, notice that the ratio of the radius of the equator of the torus in the core of proton to the radius of the gluon loops the neutral pions consist of is 1.5 so there should be stars with such ratio of principal frequencies also. The same concerns the quasars.

John F. Lindner, *et al.* (February 2015), shows that some of Cepheid and 41 RR Lyrae variable stars pulsate with multiple frequencies. Several of these stars, including the RRc Lyrae star KIC 5520878, pulsate with two principal frequencies, which are nearly in the golden ratio $\varphi = (1 + \sqrt{5}) / 2 \approx 1.618$ [1]. But it is not the whole story. The KIC 5520878 has primary and secondary frequencies at $f_1 \approx 1/(0.266 \text{ d})$ and $f_2 \approx 1/(0.169 \text{ d})$ i.e. $f_2/f_1 \approx 1.57$. We can see that it is not the golden ratio. The distance between the golden ratio and the ratio of frequencies is about 3%.

Here we show that the ratio $f_2/f_1 \approx 1.57$ is directly associated with the atom-like structure of baryons which leads to the foundations of the Chaos Theory [2C]. The atom-like structure of baryons follows from the succeeding phase transitions of the superluminal non-gravitating Higgs field [2A]. Within SST we showed that, for example, the structure of proton leads to the first Feigenbaum constant $\delta = 4.66920\dots$ [2C]. Outside the nuclear strong fields, i.e. the fields having internal helicity, the gluons behave as photons i.e. the internal structure of proton leaks outside it [2A], [2C]. The leaking structure of protons causes that, for example, the structure of quasars is self-similar/dual to the structure of the core of protons/baryons. We can assume that similar structure is in the star KIC 5520878.

Mass of the condensate in the cores of baryons is $Y = 424.1245$ MeV whereas the torus in the core produces the neutral pions [2A]. Mass of the neutral pion is $M_{Pion(o)} = 134.9766 \pm 0.0006$ MeV [3]. According to the SST, there is the four-particle symmetry [2A], [2D]. A neutral pion consists of two loops composed of gluons so there are preferred the binary systems of the neutral pions.

Calculate the ratio of masses of the condensate and two neutral pions

$$R = Y / (2 M_{Pion(o)}) = 1.5711. \quad (1)$$

We can see that R is very close to the ratio of frequencies $f_2/f_1 \approx 1.57$ for the non-chaotic star KIC 5520878.

Summary

Within the Scale-Symmetric Theory we showed that the structure of proton leads to the Theory of Chaos and that, due to the gluon-photon transition, such structure leaks from protons.

We proved that the structure of the non-chaotic star KIC 5520878 mimics the internal structure of the core of baryons. The more precise observations should show that the ratio of the two principal frequencies for KIC 5520878 is 1.5711 (the today observations lead to 1.57) and that the ratio has nothing with the golden ratio 1.618....

Moreover, notice that the ratio of the radius of the equator of the torus in the core of proton to the radius of the gluon loops the neutral pions consist of is 1.5 so there should be stars with such ratio of principal frequencies also. The same concerns the quasars.

References

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