Introduction to Smarandache-Christianto (SC) potential

a. **Definition:**
A new type of potential for nucleus, which is different from Coulomb potential or Yukawa potential. This new potential may have effect for radius range within
r = 5 - 10 fm.

b. **Reasoning:**
It is known that Yukawa potential has been derived from radial Klein-Gordon equation. Yukawa was able to predict new type of particle, which then it was coined as 'meson'.[1] Of course, in history the 'meson' associated to Yukawa was not observed with high-precision. [2][12]

But recently there is critics that Yukawa potential has problems because it uses Klein-Gordon with Lagrangian over real. [3]

Alternatively, one can extend Klein-Gordon using biquaternion number, and it will lead to a new type of potential having sinusoidal form [4][5]. It is coined as 'SC-potential'. [6]

Interestingly, a quite similar form of potential has been derived by M. Geilhaupt. Using modified Klein-Gordon equation he comes up with sinusoidal wave representation of electron, which can be used to predict electron mass and charge. He called this equation: unified force equation. [7]

c. **Implications:**
For experimental verification of this new potential, we find possible application in the context of Condensed Matter Nuclear reaction [5][6]. According to Takahashi's research, it is more likely to get condensed matter nuclear reaction using cluster of deuterium (4D) rather than using D+D reaction (as in hot-fusion, in this process Coulomb barrier is very high). The probable reaction according to Takahashi is [8]:

4D --> 8Be

Then because be is unstable, it will yield:

8Be --> 4He + 4He + 47.6 MeV

In recent work, Takahashi shows that in the TSC framework it is also possible to do CMNS reaction not only with DDDD, but also with DDDH, DDHH, DHHH, or HHHH [8], where the reaction can be different from above:

DDDH --> 7Be --> 3He + 4He + 29.3 MeV

or

DHDH --> 6Be --> 3He + 3He

In other words, TSC can be A mixture of heavy and light water. [8]

More interestingly, his EQPET/TSC (*tetrahedra symmetric condensate*) model, Takahashi can predict a new potential called STTBA (*sudden-tall thin barrier approximate*) which includes negative potential (reverse potential) and differs from Coulomb potential [8].

Therefore the SC-potential which has sinusoidal form can be viewed as a generalization of Takahashi's TSC/STTBA potential.[9]

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Further experiments are recommended in order to verify this proposition.

Further reading:

[1] http://en.wikipedia.org/wiki/Yukawa potential

[2] Grosjean, P.V., Static meson potential and Deuteron problem, **Nature** 166 (1950), http://www.nature.com/nature/journal/v166/n4230/abs/166907a0.html

[3] Comay E. Apeiron, 2007, v. 14, no. 1; arXiv: quant-ph/ 0603325.

[4] V. Christianto & F Smarandache, "Numerical solution of radial biquaternion of Klein-Gordon equation," **Progress in Physics** vol.1 (2008) URL: http://ptep-online.com/index_files/2008/PP-12-08.PDF

[5] V. Christianto & F Smarandache, "Interpretation of solution of radial biquaternion of Klein-Gordon equation and comparison with EQPET/TSC model," Infinite Energy (to appear in July 2008).

[6] F. Smarandache & V. Christianto (eds.), Hadron models and related new Energy issues, InfoLearnQuest, January 2008.

[7] M. Geilhaupt, http://hestia.hs-niederrhein.de/~physik07/index.html

[8] Kowalski, L., "An interesting theory of Akito Takahashi," http://pages.csam.montclair.edu/~kowalski/cf/249takahashi.html

[9] Takahashi, A., http://newenergytimes.com/Library/2005TakahashiA-CondensedMatterNuclearEffects.pdf

[10] www.iscmns.org

[11] Hideki Yukawa, http://en.wikipedia.org/wiki/Hideki_Yukawa

[12] History of meson, http://en.wikipedia.org/wiki/Meson

[13] K-capture, http://en.wikipedia.org/wiki/K-capture