

# Spin's Meaning, Characterization and Calculation In New Particle Physics

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Abstract: giving a viewpoint with regards to the spins of elementary particles from first principle; in the particular, about the proton's spin meaning, characterization and calculation in the consistent and definite form that suitable to it in all of different states

## Main viewpoints and conclusions:

In quantum mechanics and particle physics, spin is a property of microscopic particles; but, it is neither revolves nor rotates due to they all are in a bound state in new particle physics. <sup>[1][2][3][4][5][6]</sup>

Spin is the observed and measured charges number of a charged elementary particle in its free state or in a system.

In elementary particles, only protons and electrons have their distinct spin number in different states; and neutrinos haven't any spin number due to it is a no-charged neutral elementary particle. <sup>[2][3]</sup>

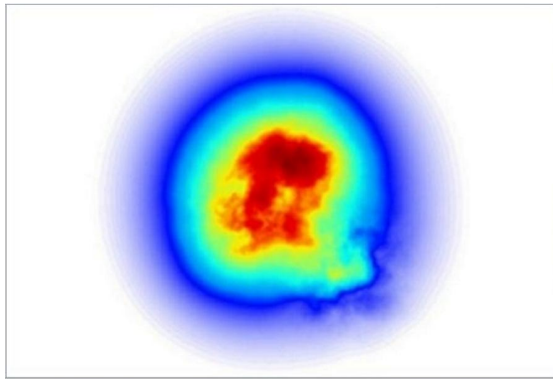
With regards to protons, a proton's spin number or averages spin number of protons that in a multi-protons system, sign the spin number of every elementary particle as  $SN$ , and  $A$  is proton's numbers in the system;  $N$  is the  $\pi$ -meson's number that combined with the protons in the system, and the spin number or averages spin number of protons is:

$$SN = 1 - N/A ; \quad \text{and } 0 \leq SN \leq 1$$

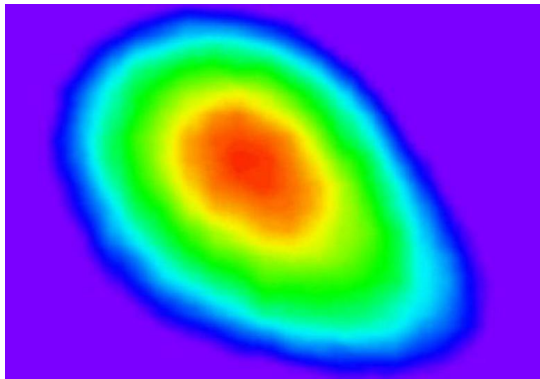
Moreover, in the system, the proton's spin number and the system energy levels is an inversely-proportional relationship, the higher the protons spin numbers, the lower the energy levels; on the contrary, the lower the protons spin numbers, the higher the energy levels. <sup>[4][5][6]</sup>

For instance:

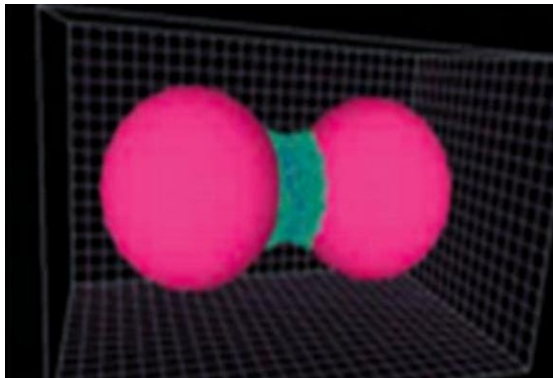
- a single proton,  $N = 0, A = 1, SN = 1$ ; the proton of a neutron,  $N = 1, A = 1, SN = 0$ ;
- every proton of a Deuteron,  $N = 1, A = 2, SN = 1/2$ ;
- every proton of a Helium-3,  $N = 1, A = 3, SN = 2/3$ ;
- every proton of a Tritium,  $N = 2, A = 3, SN = 1/3$ .



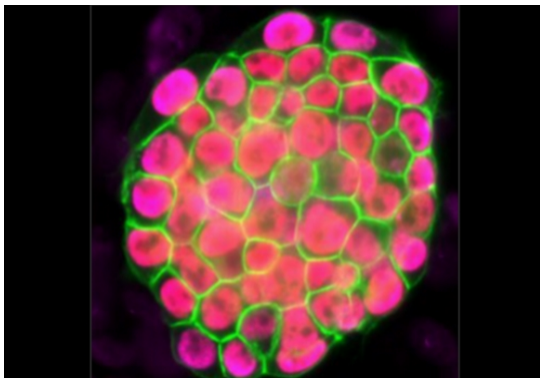
*Image 1. a proton*



*Image 2. a neutron*



*Image 3. a light nucleus*



*Image 4. a heavy nucleus*

## References

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[https://en.wikipedia.org/wiki/Spin\\_\(physics\)](https://en.wikipedia.org/wiki/Spin_(physics))

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[4] *The structure, property and parameters of nucleons*

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[7] *The credit of Image 1*

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