Yang-Mills theory is the typical form of torsion tensor

By Wan-Chung Hu

Abstract

In the single page of this article, I stated that Yang-Mills theory (the foundation of standard model) is actually the typical form of torsion tensor. Since electromagnetic field is also the torsion tensor without the [x,y] part. We can easily unite strong force field, weak force field, and electromagnetic field by integrating these torsion tensors. This provides the proof of Yang-Mills theory existence. And, I also solved Yang-Mills mass gap problem in strong interaction in my previous study. Thus, the grand unified theories can be finished.

Main text

We know the Yang-Mills theory has the following form:

$$\mathrm{Fuv} = \partial \mathrm{uAv} - \partial \mathrm{vAu} - [\mathrm{Au}, \mathrm{Av}]$$

And, torsion tensor has the following form:

T(X,Y)=DxY-DyX-[X,Y]

where [*X*,*Y*] is the Lie bracket of vector fields.

[X,Y](f)=X(Y(f))-Y(X(f))

For instance, [X,Y]=XY-YX

Since Yang-Mills theory is describing strong and weak interaction, Yang-Mills theory can be described as torsion tensor. Besides, electromagnetic field can also be described as torsion tensor:

T(X,Y)=DxY-DyX

Thus, we can integrate the above two forms of torsion tensors to unify the strong interaction, weak interaction, and electromagnetism. Thus, it also help to prove the existence and correctness of Yang-Mills theory. Since gravity field can be described as curvature. The grand unified theory further unite curvature and torsion to integrate all the four fundamental force fields.