A LITTLE PHYSICS, CAN LEAD TO A LOT OF MATHEMATICS AND VICE VERSA

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Abstract

In this talk I will discuss isotopes in mathematics. Physicists first discovered (mathematical) isotopes in the 1980's. For a simple example of a mathematical isotope, let $\left(\mathbb{R},+,\cdot\right)$ represent the real number field with the usual operations of addition "+", and multiplication "$\cdot$". If a is any number, define the negative $\hat{a}$ by $\hat{a}+a=0$. If we take the negative values, together with multiplication defined as $*=(-1)$, then $\left(\widehat{\mathbb{R}},+,*\right)$ is also a representation of the real numbers. It is also an isotope, called the isodual of $\left(\mathbb{R},+,\cdot\right)$. I will discuss the general theory of mathematical isotopes and show how they allow us to use compact groups to study noncompact groups. I will also show how we can use $\left(\widehat{\mathbb{R}},+,*\right)$ to give an improvement of the big bang model that:

1. provides a natural arrow for time, with an initial point in time set at zero,
2. provides a natural explanation for the lack of antimatter in our universe,
3. provides antiparticles as particles moving backward in proper time,
4. provides conservation of momentum and angular momentum and,
5. provides a natural explanation for the smoothness of the 2.7K microwave background radiation (MBR), i.e. the fact that the MBR (which we can measure, and sheds light on the early universe) appears almost the same in every direction.