



The Strangest Thing in Our Universe

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01

Introduction

Why I chose This Topic

01 Interesting

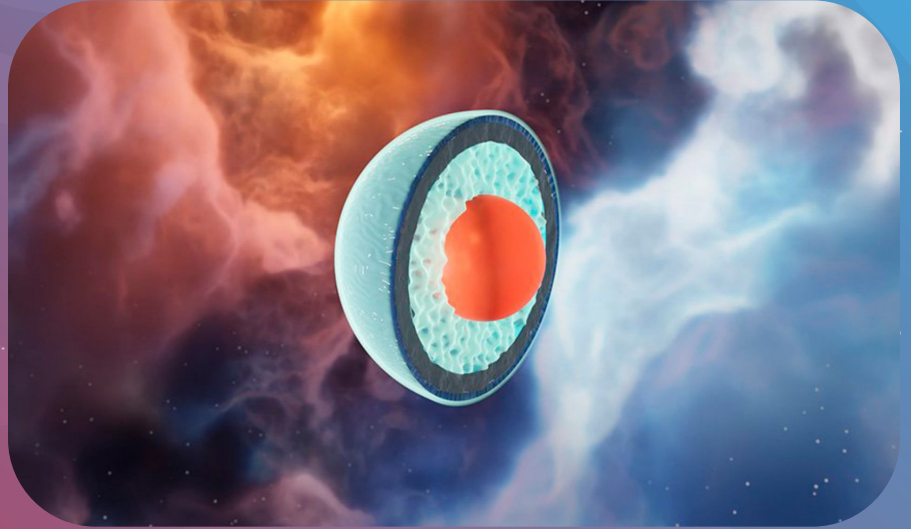
Strange quark could change what we know about the universe

02 Significant

Could revolutionize many fields of physics

The Problem

Theoretical models have predicted the existence of SQM but no direct observation has been made yet





02

Literature Review

Composition/Theoretical Basis

- Theoretical with no direct observations
- Made of equal parts up, down, and strange quarks
- Is within the standard model alongside the quark family

Predicted Properties

- Most stable form of matter (kind of)
- Typically more dense than nuclear matter
 - Exists only under extreme astrophysical conditions (e.g., neutron star cores)

LIT REVIEW

Nature & Phase transition

- Can convert normal matter into strange matter
- Likely caused by quark exchange leading to an energy imbalance
- Chain reaction

Composition/Theoretical Basis

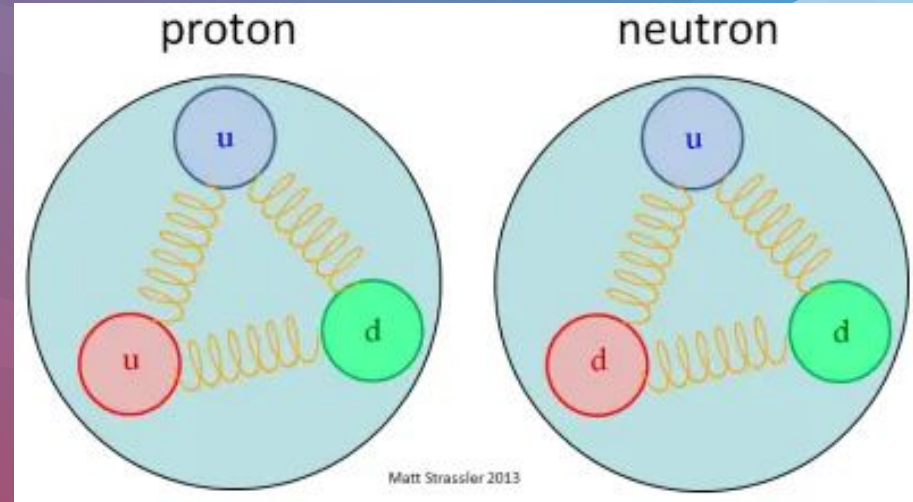
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STANDARD MODEL OF ELEMENTARY PARTICLES

Q U A R K S	UP mass 2,3 MeV/c ² charge $\frac{2}{3}$ spin $\frac{1}{2}$ u	CHARM 1,275 GeV/c ² $\frac{2}{3}$ $\frac{1}{2}$ c	TOP 173,07 GeV/c ² $\frac{2}{3}$ $\frac{1}{2}$ t	G A U G E B O S O N S	GLUON 0 0 1 g	HIGGS BOSON 126 GeV/c ² 0 0 H
	DOWN 4,8 MeV/c ² $-\frac{1}{3}$ $\frac{1}{2}$ d	STRANGE 95 MeV/c ² $-\frac{1}{3}$ $\frac{1}{2}$ s	BOTTOM 4,18 GeV/c ² $-\frac{1}{3}$ $\frac{1}{2}$ b		PHOTON 0 0 1 γ	
	ELECTRON 0,511 MeV/c ² -1 $\frac{1}{2}$ e	MUON 105,66 MeV/c ² -1 $\frac{1}{2}$ μ	TAU 1,777 GeV/c ² -1 $\frac{1}{2}$ τ		Z BOSON 91,2 GeV/c ² 0 1 Z	
	ELECTRON NEUTRINO <2,2 eV/c ² 0 $\frac{1}{2}$ ν_e	MUON NEUTRINO <0,17 MeV/c ² 0 $\frac{1}{2}$ ν_μ	TAU NEUTRINO <15,5 MeV/c ² 0 $\frac{1}{2}$ ν_τ		W BOSON 80,4 GeV/c ² ± 1 1 W	

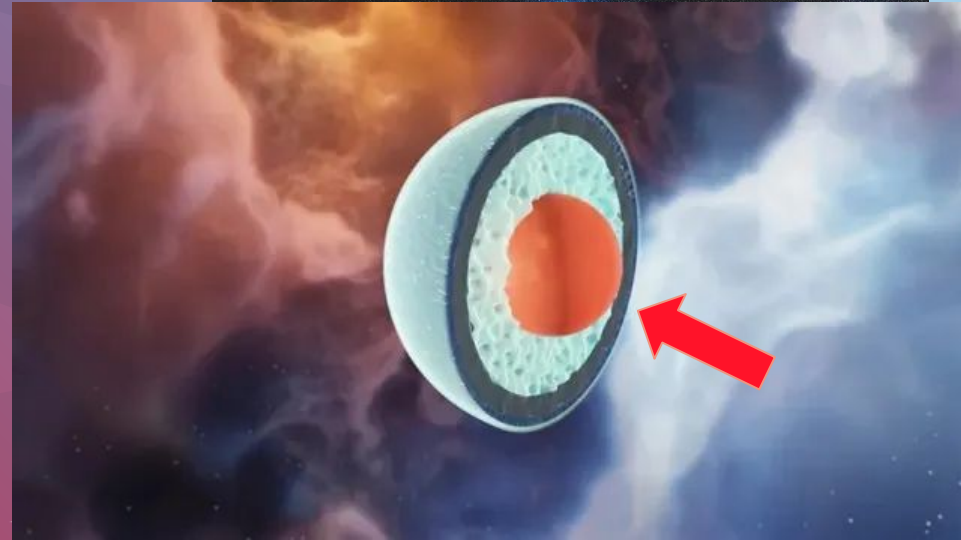
Nature & Phase transition

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Predicted Properties

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The background is a vibrant, stylized space scene. It features a gradient of colors from deep red on the left to bright blue on the right. There are several large, abstract, wavy shapes in shades of purple and blue, resembling nebulae or galaxies. Scattered throughout are numerous small white dots representing stars, and a few larger, colorful planets or moons. One planet in the upper right has a yellow and orange surface, while another has a blue and white striped pattern. The overall aesthetic is modern and artistic.

03

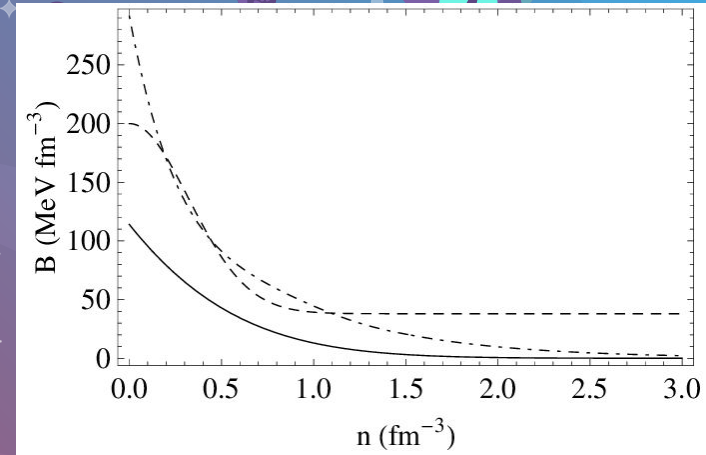
Research Methodologies

Descriptive Approach

In this research inquiry, a **descriptive approach** was applied to analyze existing literature and data to explore the concept of strange quark matter (SQM). Specifically it was used to review and synthesize the findings from existing studies on SQM, as it allowed for a clear understanding of current theories and predictions.

Strange Matter Hypothesis

The strange matter hypothesis suggests that SQM might be the true ground state of matter. And the formation of SQM may only happen in extreme environments such as in the core of a neutron star. This is where it would transition from hadronic matter to quark matter. Quark matter is a hypothetical state of matter where quarks are deconfined and move around freely



Impact on the Field of Physics

Because of the complicated nature of observing quarks and inside of neutron stars, everything is highly theoretical with no empirical or direct evidence to support anything. But if we manage to learn of its existence and measure its B value for the bag model, it would completely change the standard model and call for a reform as a new fundamental form of matter governed by the strong force emerges.