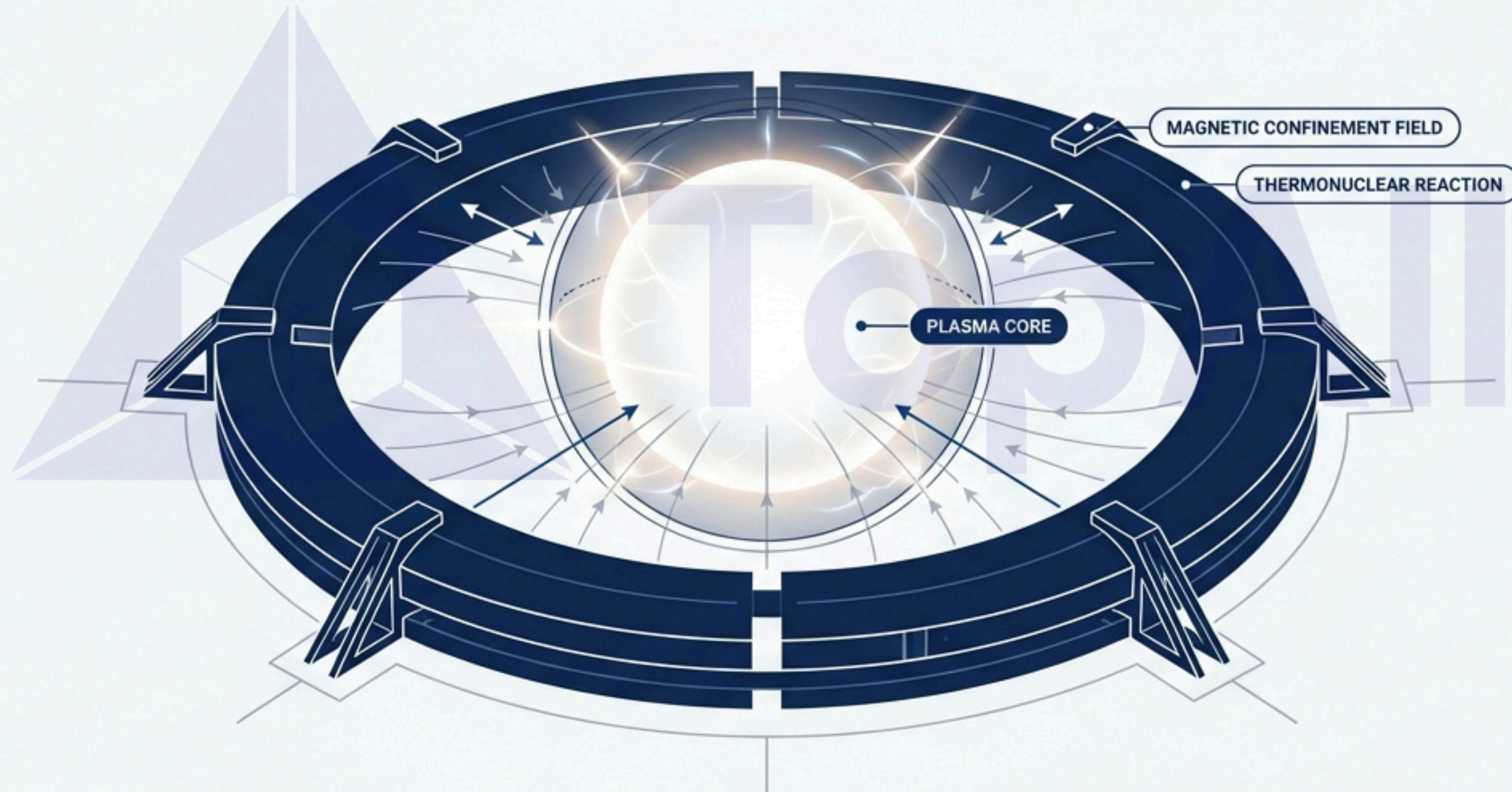


Can We Build a Star on Earth?

The physics, challenges, and promise of controlled thermonuclear fusion (Section 13.7.3).



Replicating Natural Fusion



Stars naturally fuse **FUSE LIGHT NUCLEI** due to **IMMENSE GRAVITY** and **CORE HEAT**, triggering a **CONTINUOUS RELEASE OF ENERGY**.



The human goal is **REPLICATING** this exact natural process inside a **THERMONUCLEAR FUSION DEVICE** to generate **STEADY, CONTROLLED POWER**.

The goal is not an explosion, but a continuous, manageable yield of energy.



You've Learned the Theory. Let's Test Them Now.

$$E=mc^2$$



Turn theory into marks with **unlimited MCQs, smart analysis, and focused revision.**

Practice Now



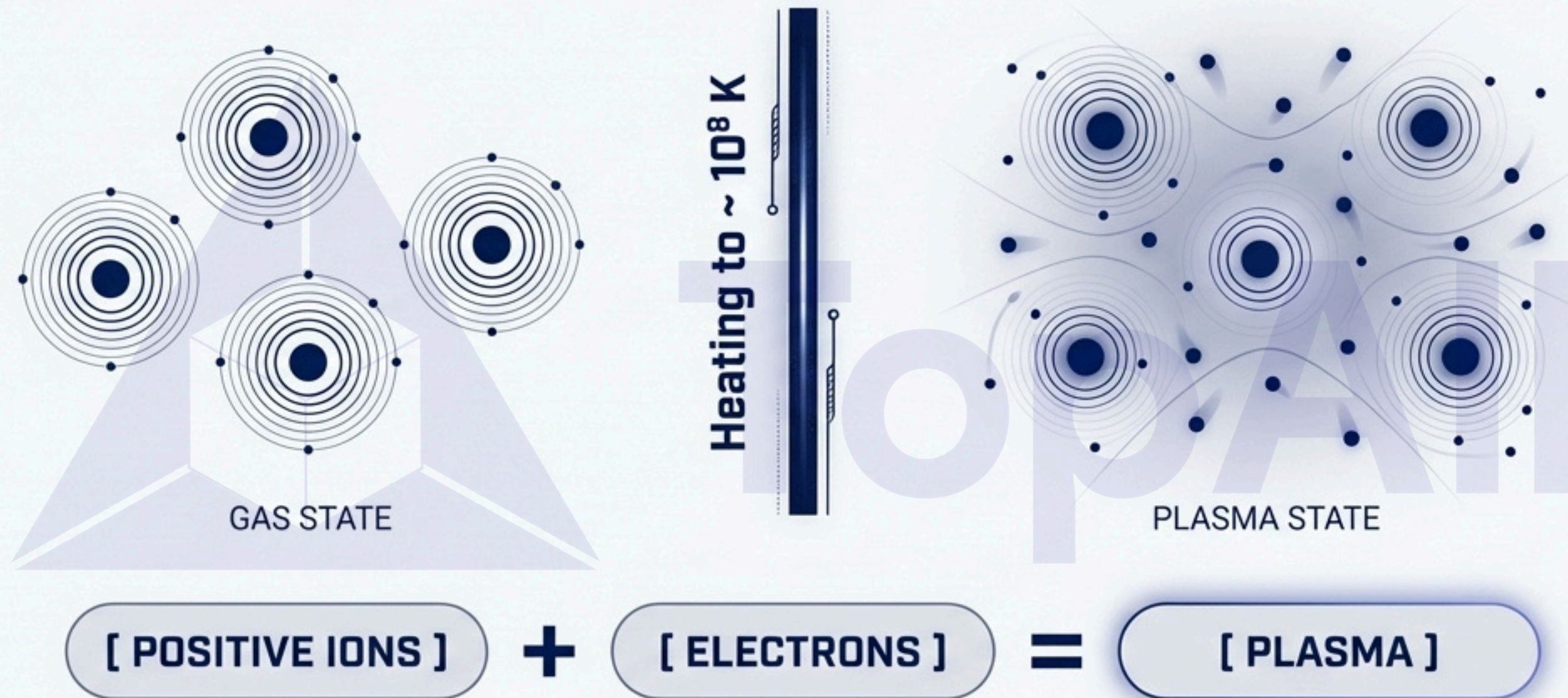
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Key Highlights

- » Free Study Material, Videos & Infographics
- » Push Your Limits with Level-Based Challenges
- » Climb the Leaderboard Among Fellow Aspirants
- » Practice Unlimited MCQs for NEET & JEE
- » Get Clear Explanations, Not Just Marks
- » Track Your Performance Smarter



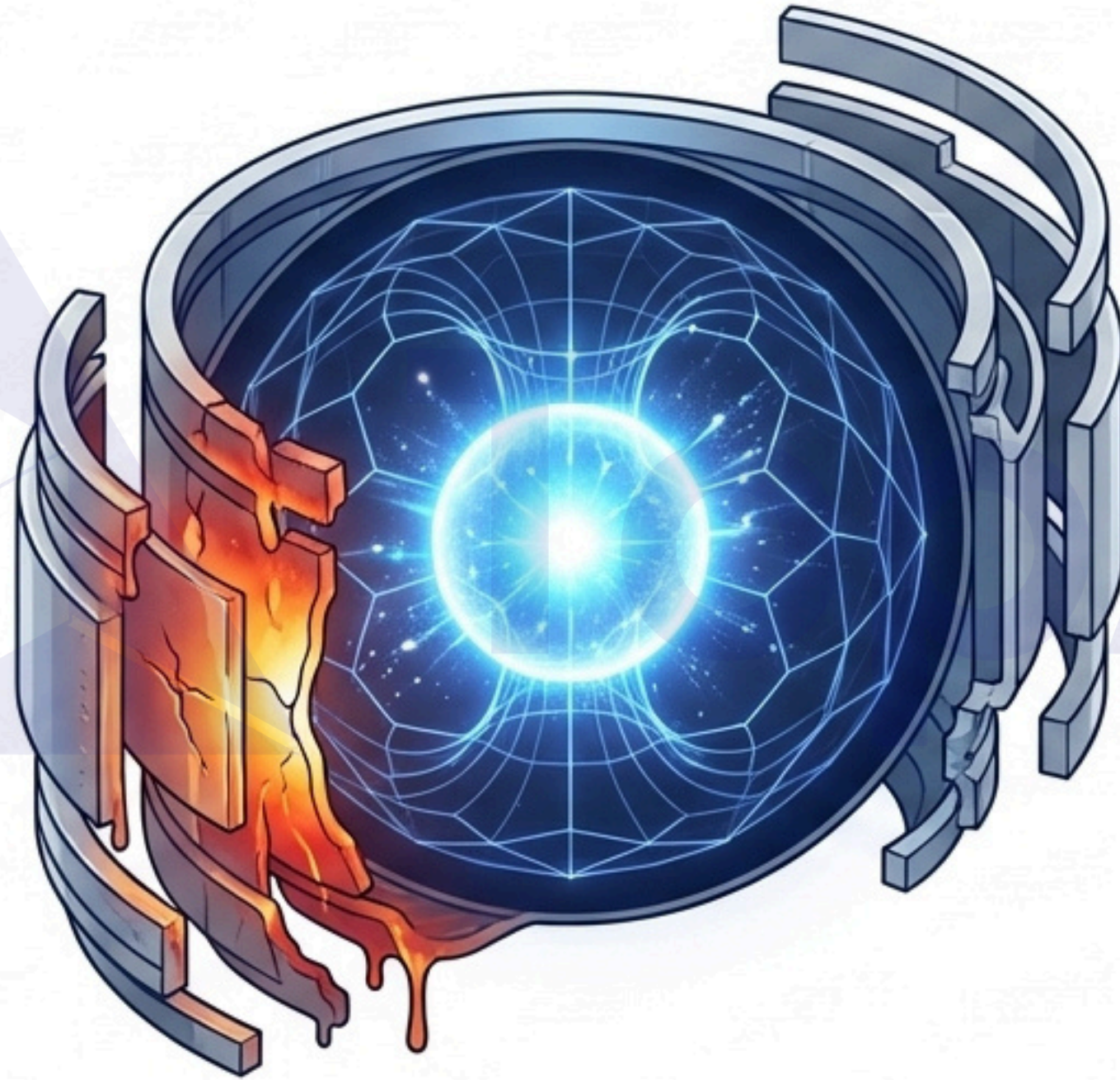
Reaching 10^8 K and Creating Plasma



To force nuclei together, the nuclear fuel must be heated to approximately 10^8 K. At this extreme temperature, atoms are stripped of their electrons, and the fuel becomes a plasma—a highly energetic mixture of positive ions and free electrons.

Why Confinement is Difficult

No physical container can withstand temperatures of **10^8 K**. Any material wall would instantly melt or cool the plasma, stopping the reaction.



Therefore, the central engineering challenge is **CONFINEMENT**—keeping the ultra-hot plasma suspended and stable without letting it touch the reactor walls.

A Global Quest for Unlimited Power



Several countries around the world, including India, are actively developing advanced techniques to solve the plasma confinement challenge.

If successful,
**controlled fusion
reactors** will supply
humanity with
**almost unlimited,
clean power.**

Section 13.7.3 at a Glance

- ✓ **[OBJECTIVE]** Replicate natural stellar fusion in a device to generate steady power.
- ✓ **[CONDITION]** Heat nuclear fuel to the extreme threshold of $\sim 10^8$ K.
- ✓ **[STATE]** At this heat, fuel transforms into a plasma (mixture of positive ions and electrons).
- ✓ **[CHALLENGE]** Confinement: No physical container can survive this temperature.
- ✓ **[POTENTIAL]** Successful fusion offers humanity almost unlimited power.



You've Learned the Theory.

Now Let's Test It.

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