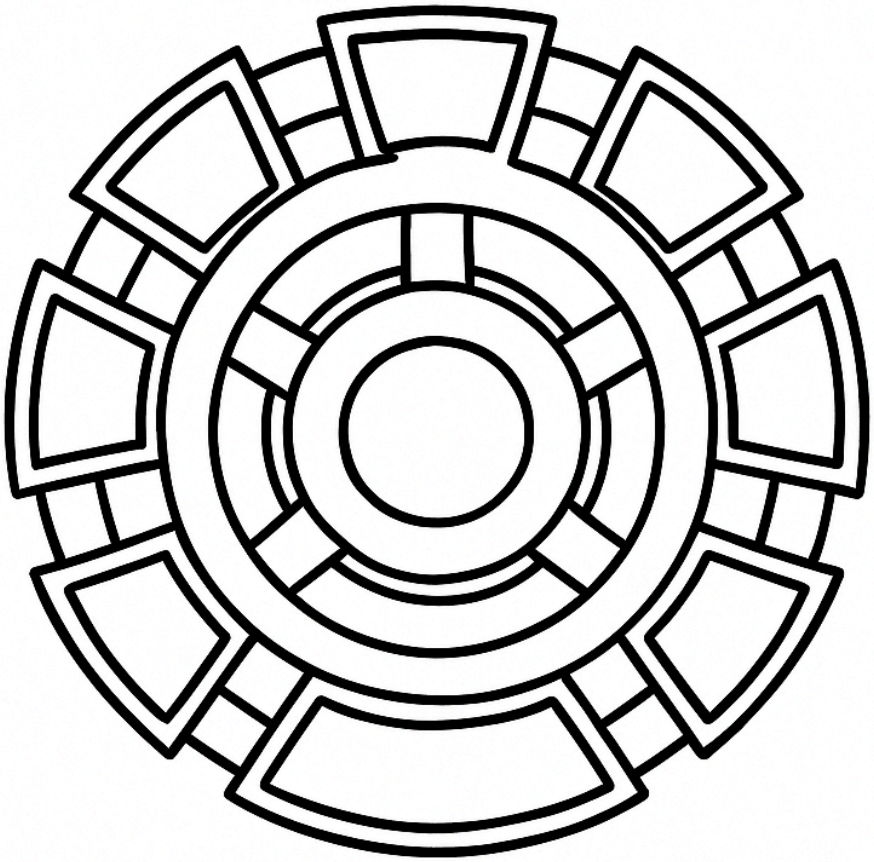

Shera fuser

(Real life arc reactor)

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Development of Shera Fuser: mk1 to mk3-A Fusion concept inspired by Arc Reactor

Abstract

The Shera Fuser is an experimental compact nuclear fusion reactor inspired by both Real Fusion physics and the fictional Arc Reactor concept from Iron Man. Designed and presented through multiple stages,from mk1 to mk3,the Shera fuser represents an effort to create a small scale ,fuel free, nonpolluting energy system using high voltage discharge and Deuterium Fusion. This document outlines the design evolution , problem solving approaches,technical changes and future roadmap

1.Insiration

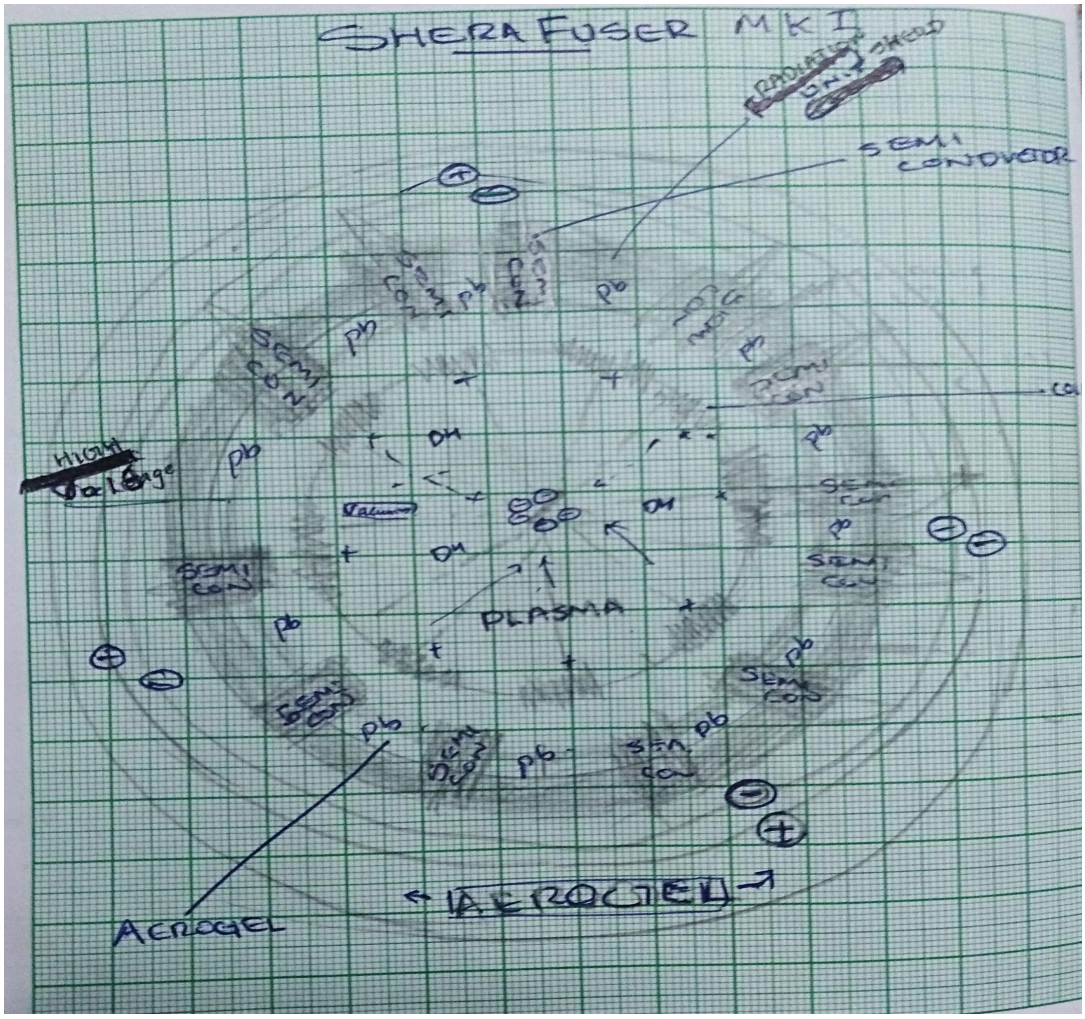
- Fictional: Tony Stark's Arc Reactor (clean,compact and powerful energy source)
- Scientific: Deuterium -deuterium fusion , High voltage plasma ignition and magnetic confinement
- Personal: A Dream to build advanced energy systems using real world,low cost components with minimal resource

2. Shera Fuser Mk I -The First Experiment

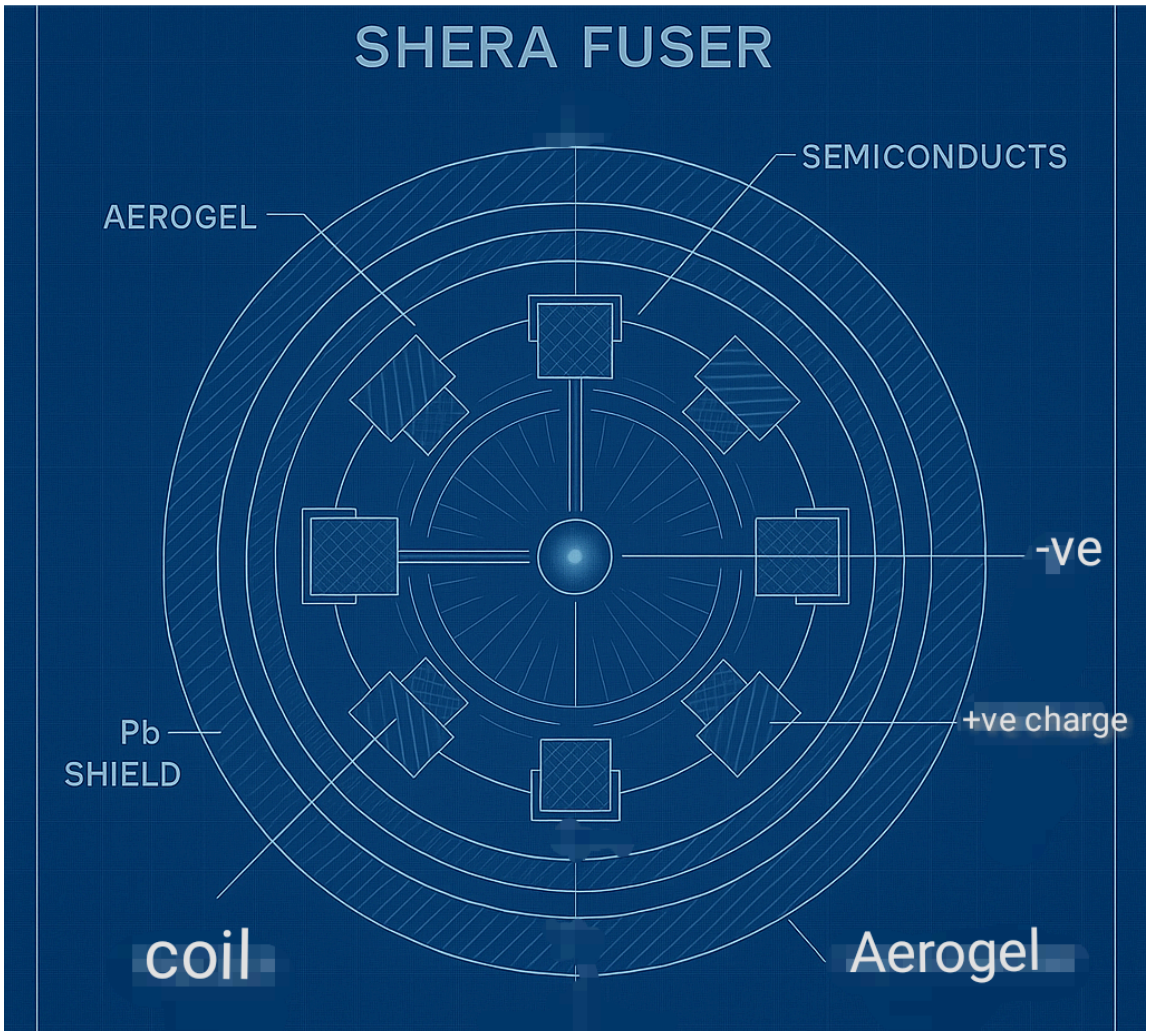
- When doing the discharge experiments with my dc high voltage booster step up module . Then for fun,I made a circular plasma ,one of the terminal of the booster connected to a metal ring and another one is connected to a syringe needle and placed the needle toward center of ring there by made a circular plasma and i noticed two things, the plasma where focused toward the center needle and a tiny thrust is forming in opposite side, thereby the two observation: i got two idea: one i developed this project and one is superionic air craft,
- In this idea i thought what if we placed this thing in vacuum and add deuterium so there is any possibility deuterium to fuse ,note the ring is connected to positive terminal and needle will be negative , then positively charged deuterium will move from ring toward needle in reduced surface area,there is a quite chance to be collide each other and fuse

Discharge experiment

invented the shera fuser idea :Shera Fuser Mk1



- To convert energy into electricity ,semiconductor is placed, lead (Pb) is coated for radiation insulation and aerogel is placed outside for heat insulation



- **Ai generated sketch (edited)**

KEY FEATURE	Central discharge needle and spherical inner chamber powered by high voltage booster module
PROBLEM FACED	• Low plasma stability • Heat loss through conduction • Low temperature difference for super conductor • Melting of Lead
LESSON LEARNED	plasma needs better confinement and insulation,Arc must be concentrated into a point, not needle

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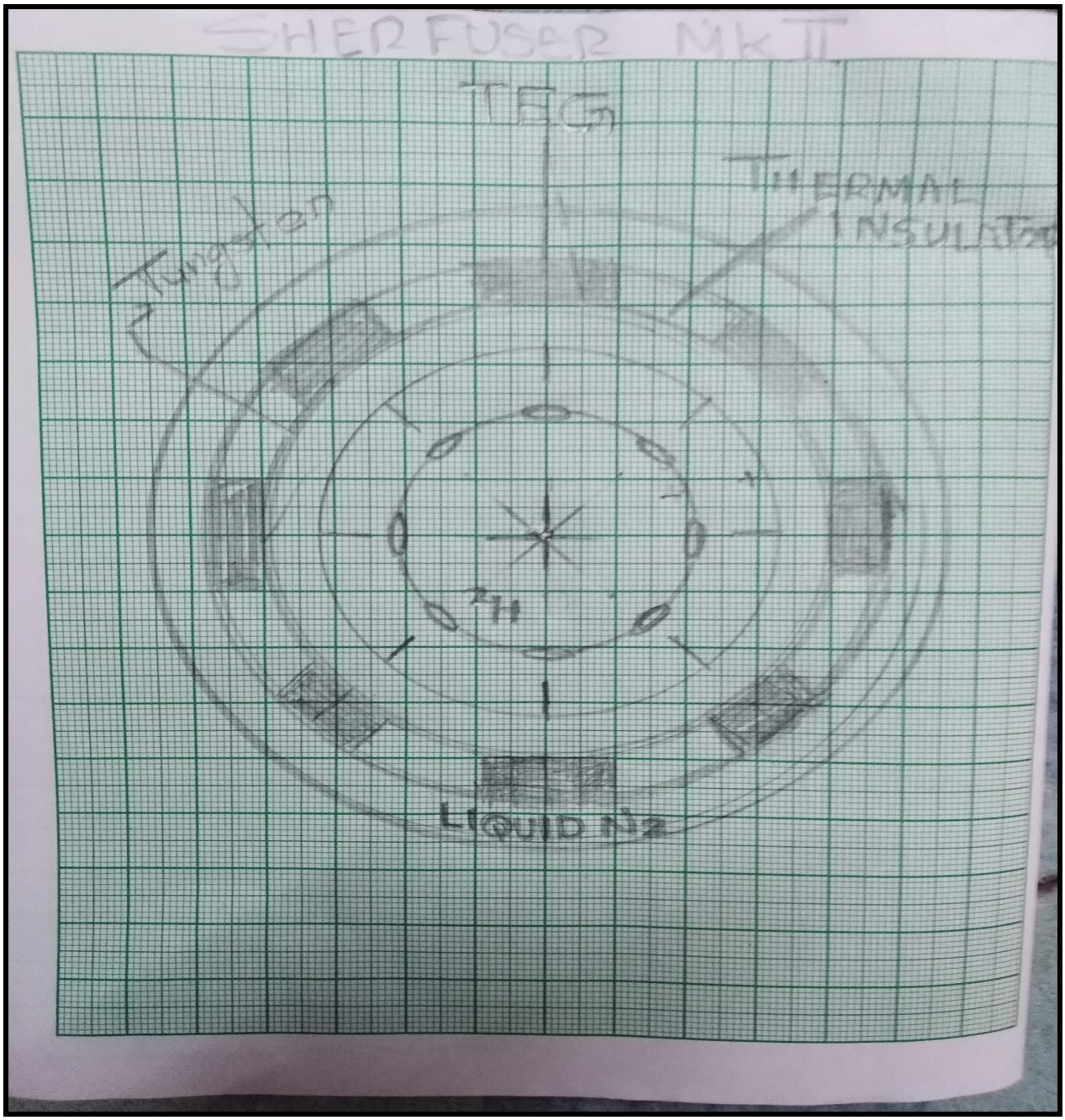
3.Shera Fuser mk II-The problem solver

Shera Fuser Mk 2 is designed to prevent all problems faced mk1 , an improvement over Mk1, in Mk2 a tiny circular coil is placed and the needle is faced to its center , and arranged a lot of them in circular shape by focusing the ray coming out of them to the center of arrangement placed in vacuum filled with deuterium . (from second idea i mentioned there) by focusing the accelerated deuterium ions to the center , and they collide in the center,this is due to when an electrically charged ions accelerate toward the center of oppositely charged circular ring ,it will pass through it due to their inertia, which i call Ion shooter mechanism

IMAGE OF MY ION SHOOTING EXPERIMENT

My sketch of shera fuser mk2



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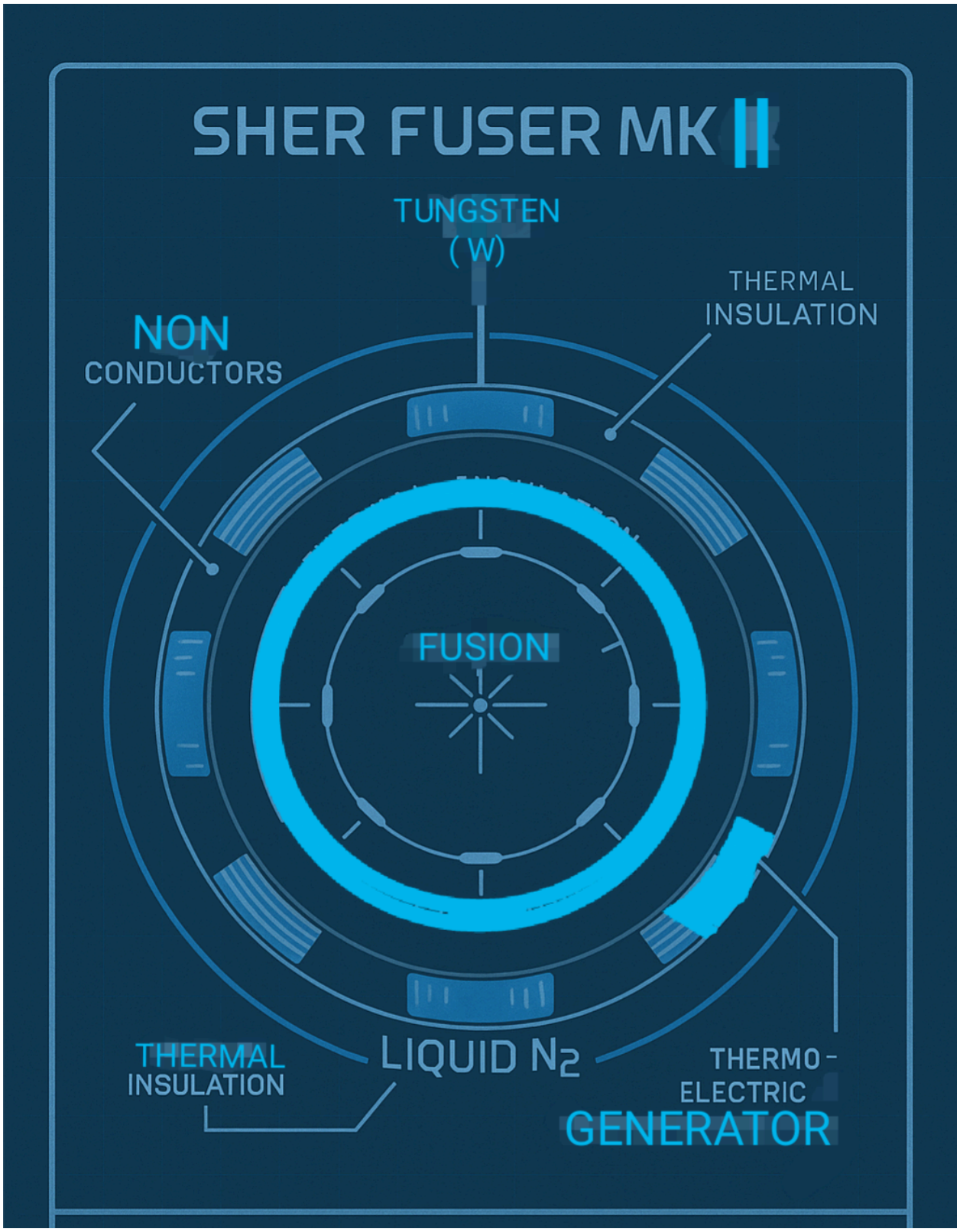
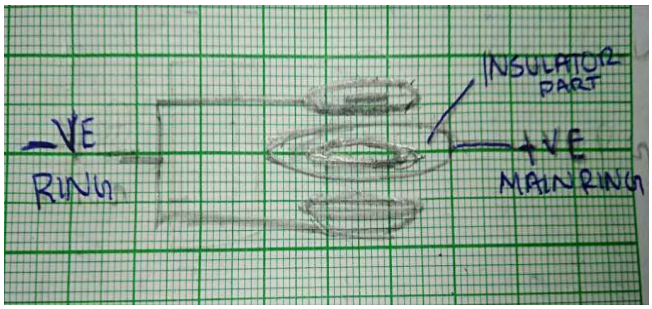


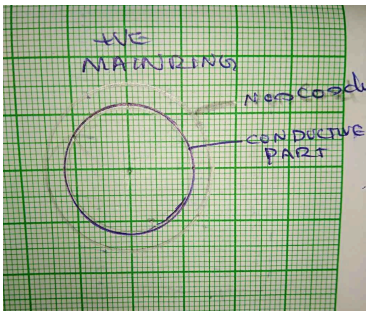
IMPROVEMENT OVER MK I	• Fusion plasma is concentrated at point ,not a material • Improved chamber insulation with thermal insulating ceramic and aerogel called thermal insulation part • Solved lead melting with replacing lead with tungsten which has higher melting point and can also block x rays and gamma rays produced through fusion • Replaced semi conductor with Thermo Electric Generator (TEG) for higher conversion of heat into electricity • Improved temperature difference for semi conductor (now TEG) by adding liquid nitrogen layer
NEW PROBLEMS	• Energy loss through light, x-rays gamma rays (Radiation) • Energy loss through light • Till fusion plasma is not perfect, not confined so which can easily move and cause destruction • Since fusion is producing high heat ,so still heat is leaking (Energy Loss) • High possibility of melting of main wall tungsten layer due to high heating(since no way heat to go out)
OUTCOMES	• Achieved stable , long -lived plasma glow . • detected higher radiation levels (indicative of possible fusion onset). • But still inefficient energy capture

4.Shera Fuser mk III-The Advanced project

Shera Fuser Mk III is a high-efficiency advanced nuclear fusion reactor designed to eliminate energy loss. It captures all usable forms of energy-thermal, radiant, and kinetic-through engineered systems such as thermoelectric generators (TEGs), thermophotovoltaic (TPV) modules, and steam-based turbines

Similar to mk II , mk III has a special mechanism for shooting ions , instead of using multiple ion shooter we use single ion shooter but powerful than previous one





Two negative rings are placed above and below of the main positive ring without touching it , two negative ring has outer circumference is little greater of inner circumference of main ring , main ring has a speciality that except its inner circumference are coated with non conductors , inner circumference sharply pointed toward its center ,therefore it act like ion shooter

ENERGY LOSS PREVENTION IN MK III

CONDUCTION	**Blocked using a vacuum chamber to prevent thermal conduction.**
CONVECTION	**Eliminated as there's no air inside the fusion chamber.**
RADIATION	**Gamma, X-rays, and UV rays blocked using dual-layer tungsten shielding**

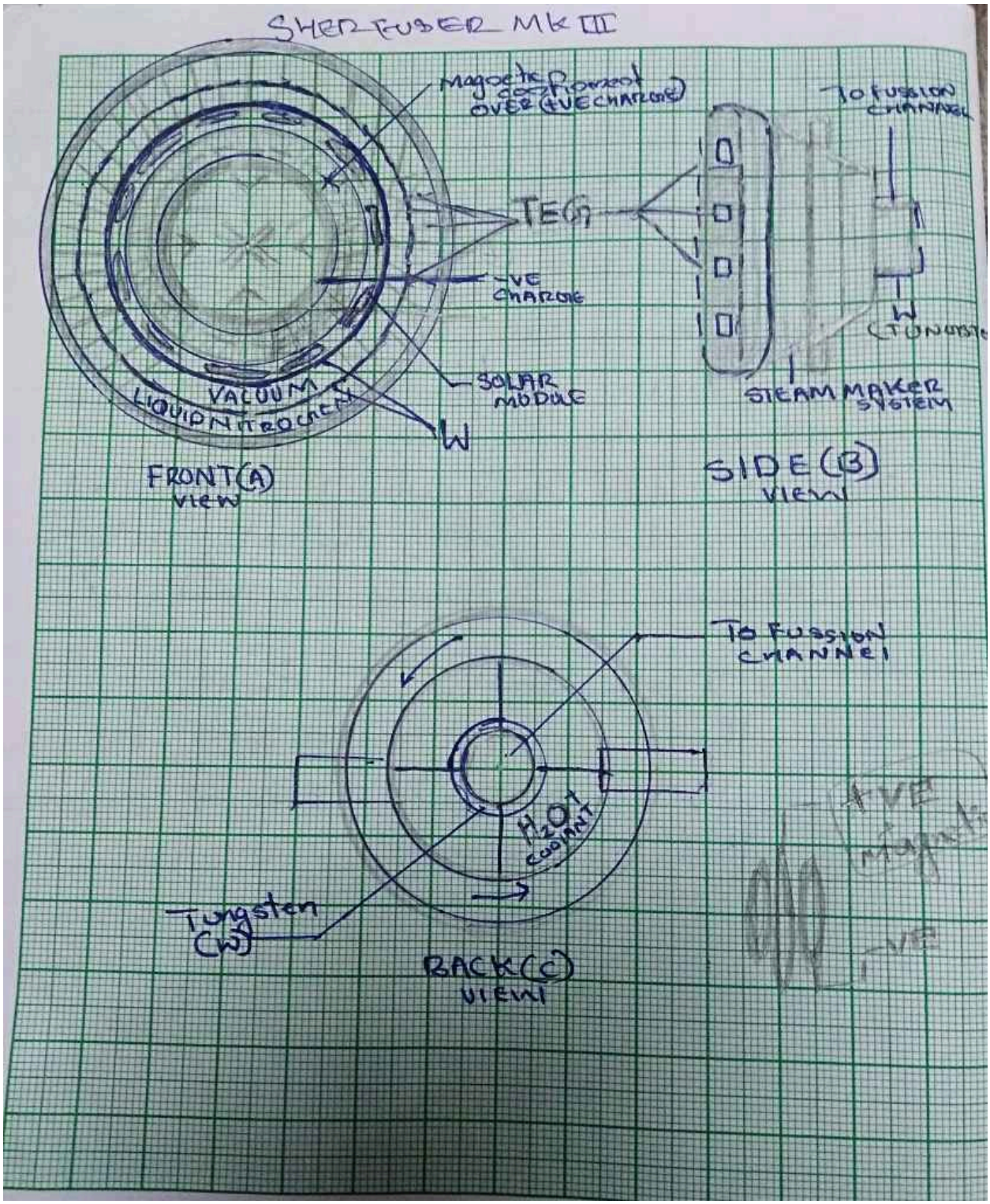
USABLE ENERGY CONVERSION

ALLOWED CONDUCTION	**Heat Captured via Thermoelectric Generators (TEGs).**
ALLOWED CONVECTION	**A steam maker system based Rankine cycle convert heat into electricity by generator(Active absorption of heat from tungsten layers, preventing from melting)**
ALLOWED RADIATION	**Radiation Captured using TPV + scintillator crystals + solar cells. -> Scintillators convert high-energy photons (radiation) to visible light. -> TPV cells and solar cells convert visible/IR to electricity.**

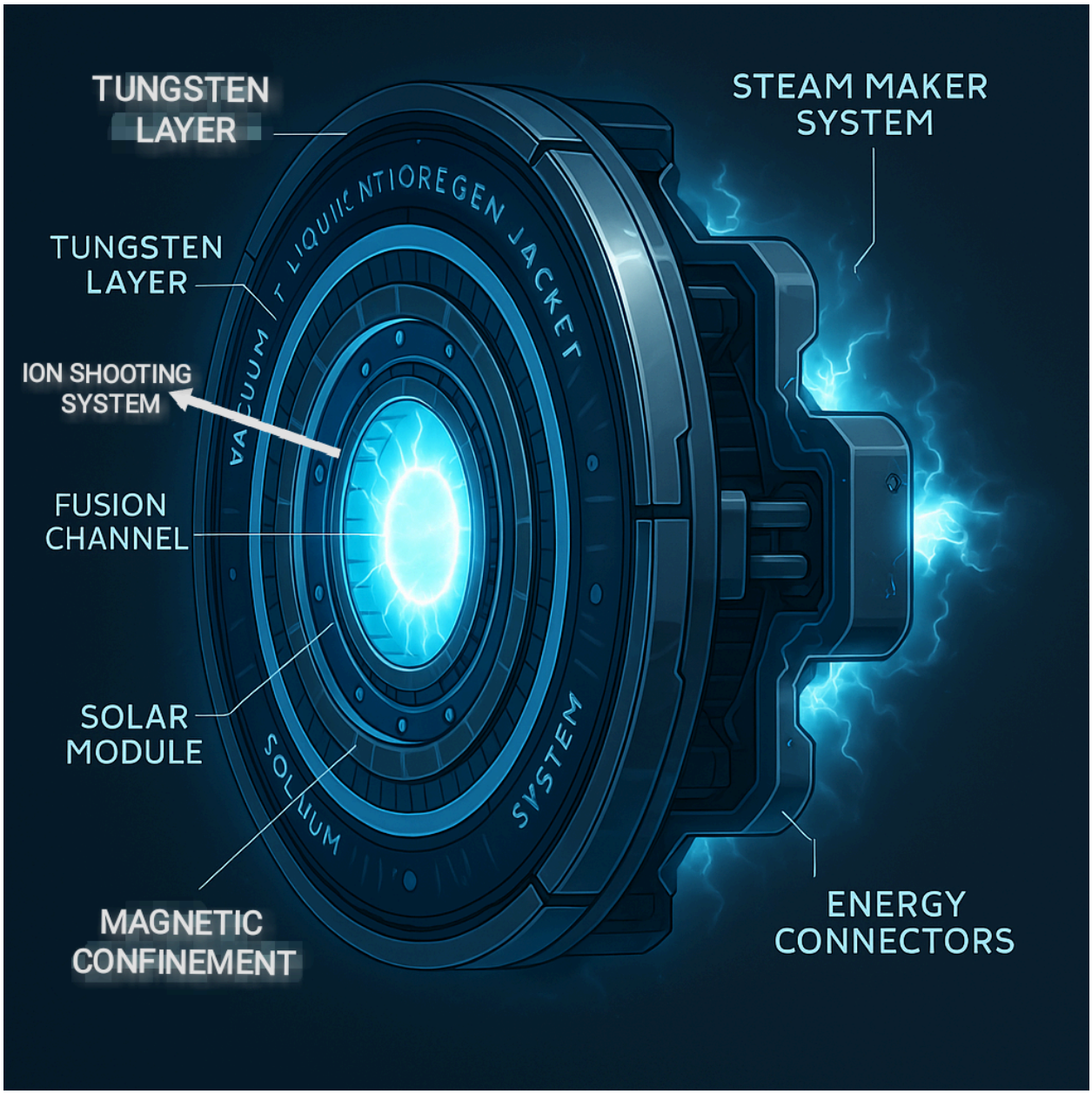
DETAILED DESCRIPTION

1. Fusion Fuel: Deuterium Gas
2. Vacuum chamber prevent Conductive and Convective heat loses
3. Dual layer tungsten shell blocks Gamma , X-rays and UV radiations
4. Termo Electric Generator (TEG) convert temperature gradient into electricity
5. Combined effect of thermophotovoltaic (TPV) , scintillator crystal and solar cell can convert all HEAT, LIGHT, GAMMA ,X-RAYS AND UV RADIATION INTO ELECTRICITY
6. A steam maker system based Rankine cycle convert heat into electricity by generator(Active absorption of heat from tungsten layers, preventing from melting)
7. A neodymium magnetic system is used to confine the fusion plasma
8. Liquid nitrogen is used for temperature gradient
9. High voltage is used to focus ions

SHERA FUSE MK III, SKETCH



SHERA FUSER MK III (AI GENERATED+EDITED)



Background

Traditional nuclear fusion systems suffer from significant energy loss via conduction, convection, and

radiation. These losses limit their practical efficiency. There exists a need for a fusion reactor that maximally

captures usable energy while effectively preventing energy wastage

Innovation Summary

Shera Fuser Mk III is a unique concept where no energy is wasted:

- All energy losses are blocked or harvested.

- Combines thermal, photonic, and pressure-based electricity generation.

- Modular design allows future enhancements.

This is the third-generation upgrade of the Shera Fuser project, pushing closer to a sustainable fusion

reactor.

5.Problem solving Approach

- Iterative design (learned from mistakes)
- Tested with simulation + Hands on
- Recorded all data and changes for each stage

6. Future improvement

- Mk IV with better improvement, higher net energy output (powerconditioning)
- Real time neutron detection system
- Integration with project 375 supersuit, or project 369 superionic air craft

7.References and ORCID

- **ORCID : https://orcid.org/0009-0000-4201-8418**
- **ZENODO DOI : 10.5281/zenodo.16271943**
- **PROJECT LOGS : http://shermodz.blogspot.com**

" Remember Science not a subject its a way to see and invent the world"

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