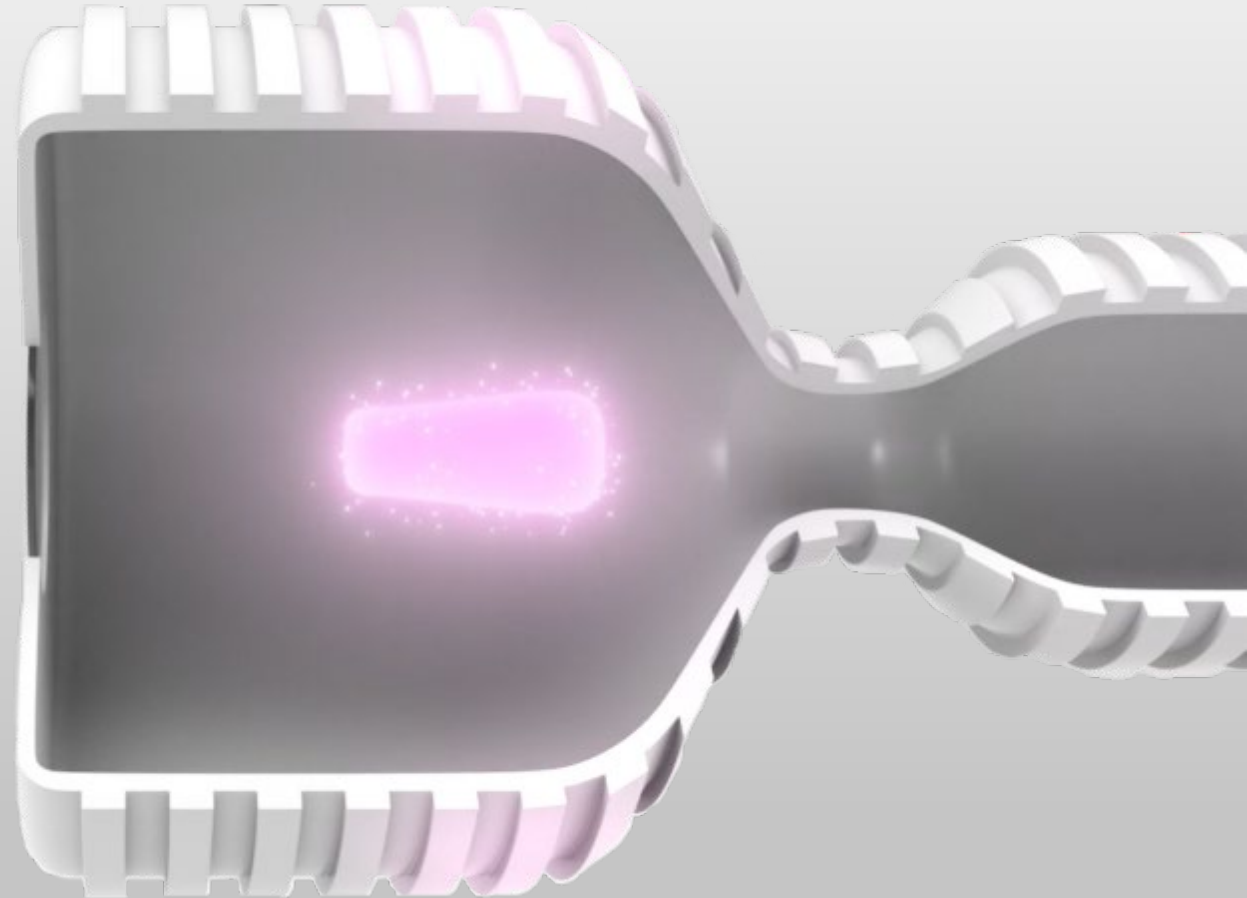


Perspectives on an Appropriate Regulatory Framework for Fusion

NRC Commission Briefing on Regulatory
Approaches for Fusion Energy Devices

Sachin Desai, Helion Energy

November 8, 2022



The Private Sector Fusion Community

Private Fusion Community

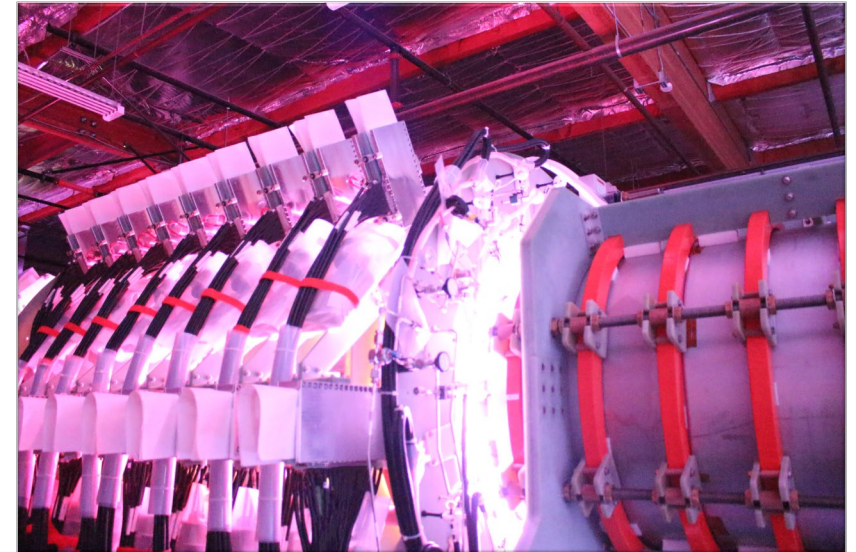
- 20+ US companies, collectively raised around \$4 billion
- Seeking to prove technology by 2024/25, deploy in 2030s

An Example – Helion Energy

- Built working prototypes that reached fusion conditions
- 6th and 7th gen devices regulated by WA State

Why Fusion?

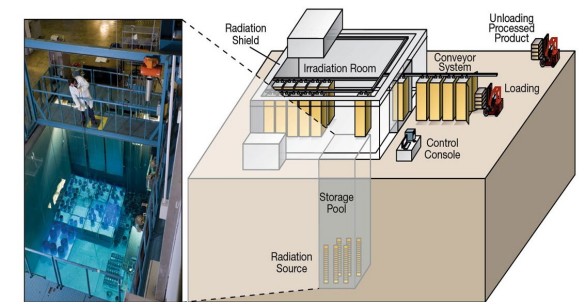
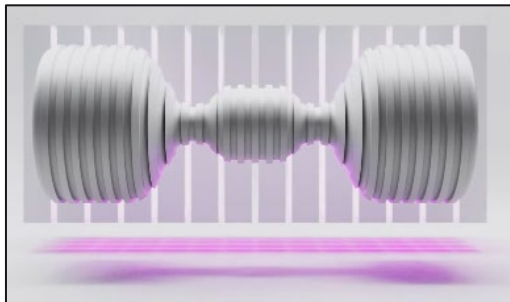
- Winning the fight against climate change requires 1GW a day
- Fusion eliminates energy insecurity



Trenta, Helion's 6th gen fusion prototype

Fusion's Safety Case – Within Scope of Materials Framework

Hazard	Comparison
Operational	
Neutron/photon radiation	<ul style="list-style-type: none"> • Commercial particle accelerators (e.g., medical cyclotrons)
Rad-material input/output	<ul style="list-style-type: none"> • Commercial accelerators
Activated material & LLRW	<ul style="list-style-type: none"> • Commercial accelerators; irradiators; general industrial users
Off-Normal	
Release of in-device material	<ul style="list-style-type: none"> • Commercial accelerators; irradiators
Release of out-of-device material	<ul style="list-style-type: none"> • Commercial accelerators; irradiators; general industrial users



Fusion's Legal Classification – Particle Accelerators

General Definition (72 Fed. Reg. 55,868)

- A “device that **imparts kinetic energy** to **subatomic particles** by increasing their speed through **electromagnetic interactions.**”

All fusion devices satisfy

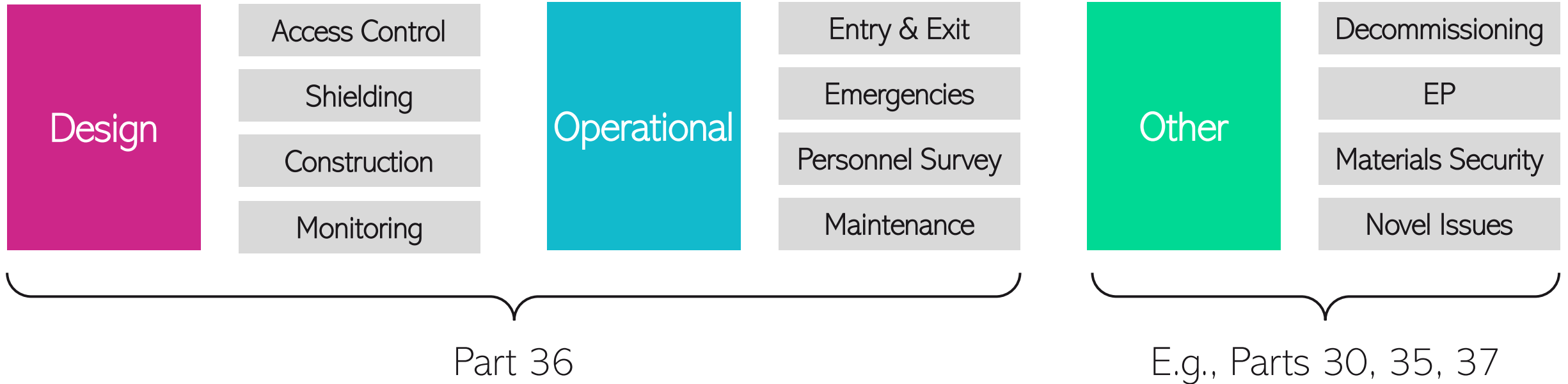
Part 30 Definition (10 CFR 30.4)

- Any machine capable of:
 - accelerating ... charged particles
 - in a vacuum
 - and of discharging the resultant particulate or other radiation **into a medium**
 - at energies usually in excess of 1 megaelectron volt.

All fusion devices satisfy

States use this classification today

Materials Framework is Uniquely Capable of Addressing Fusion



- Materials framework can handle **diversity** (e.g., Part 35, Part 37)
- Materials framework can handle **novelty** (e.g., Part 35.1000)
- Materials framework can handle **facilities** (e.g., Part 36)

Conclusion

- Fusion is a world-changing energy solution
- Fusion hazards are akin to those in accelerators, irradiators, and other materials facilities
- The materials framework has the tools to handle fusion today and over time

