

Overview of GA Activities to Accelerate the Deployment of Fusion Energy

Presented at

Fusion Power Associates

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Fusion Power Is on the Cusp of Reality: GA Embraces the Community Vision for Deploying Fusion to the Grid

- As private company, GA seeks to be global player in developing fusion energy through scientific and technological innovation
- GA is partnering with the community to move forward together with fusion, driven by:
 - Scientific excellence → FPP and fusion energy development
 - Engineering excellence → global providers of fusion systems & services
 - Advances in fusion → Applications beyond fusion

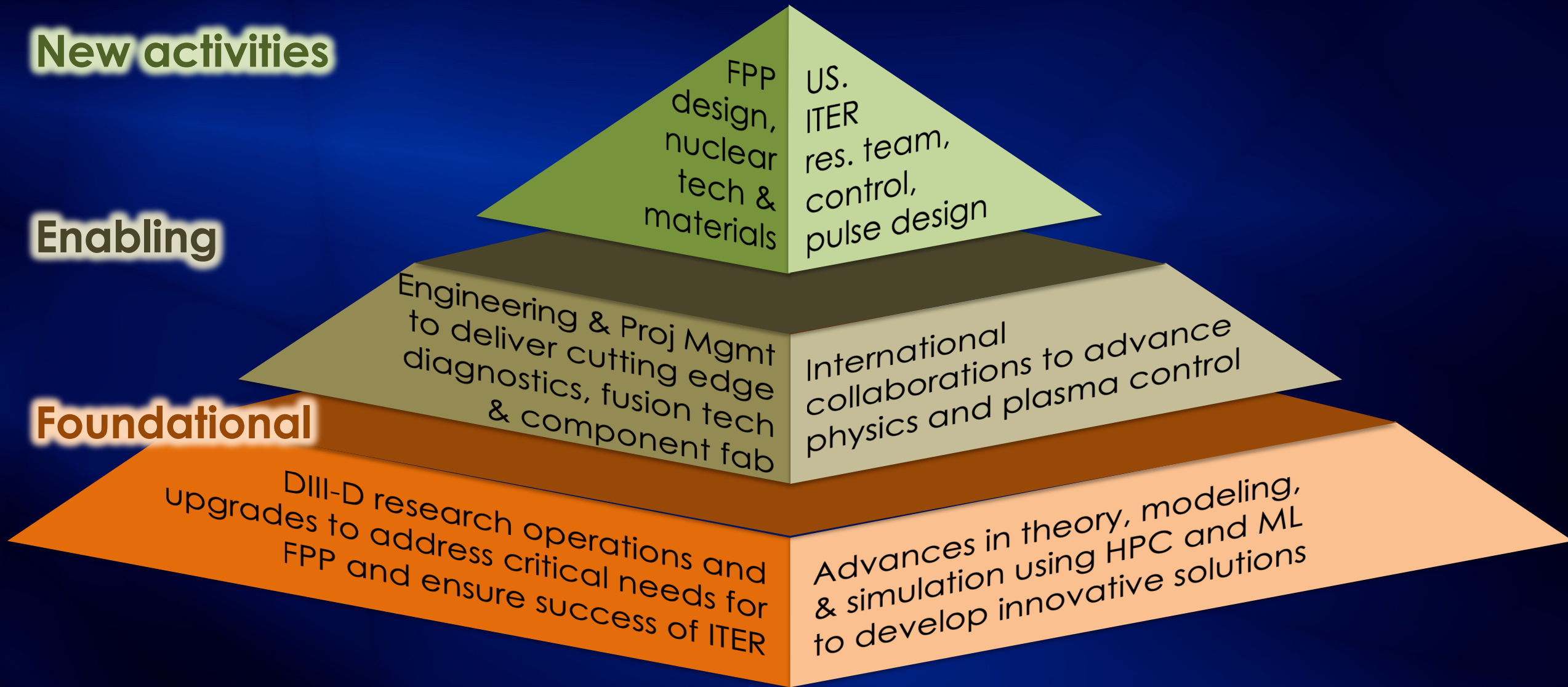


Powering the U.S with Fusion Requires Leveraging Existing Programs and Developing New Initiatives and Directions

New activities

Enabling

Foundational



We Are Actively Building Bridges and Seeking Partners to Unite FES, National Labs, Universities & Industry

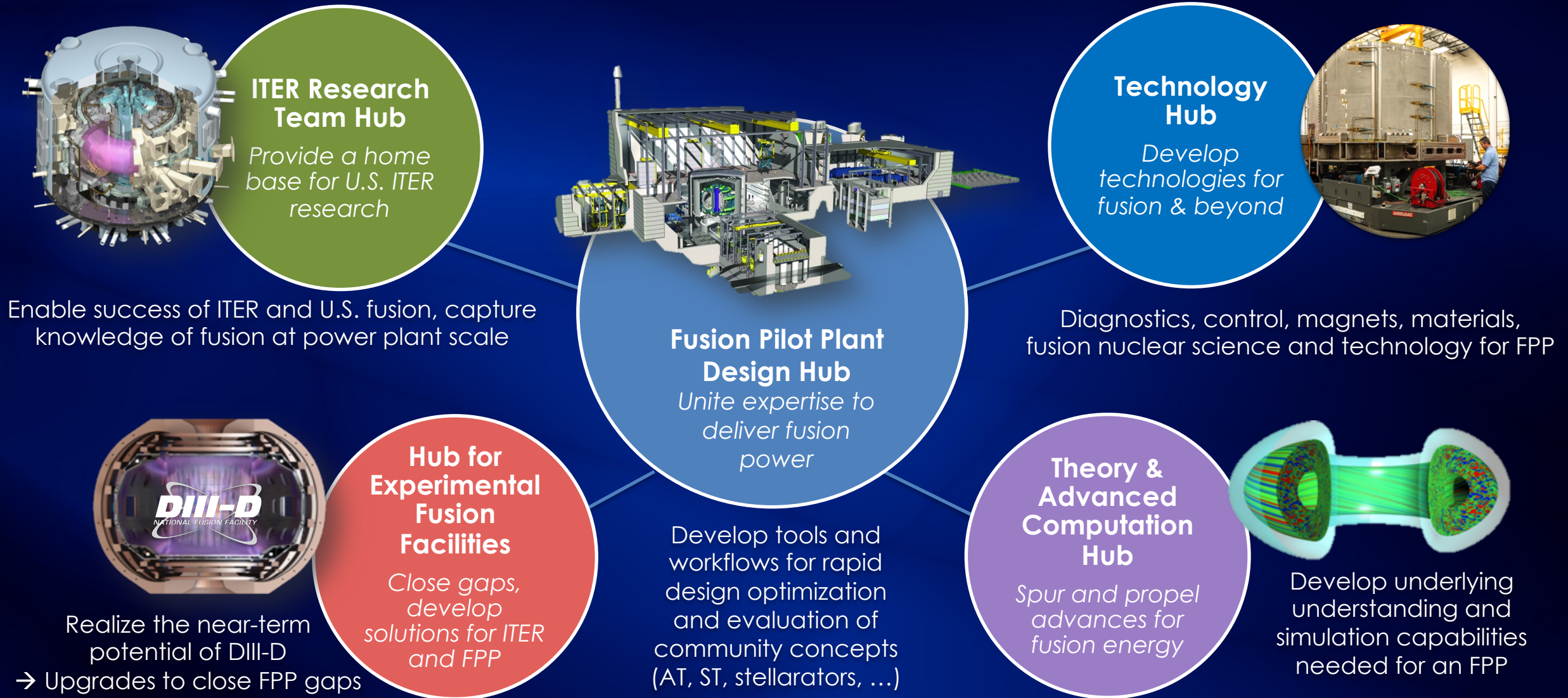
- **Success of fusion and realization of FPP requires large collaborative effort**
 - Strong partnerships
 - Effective coordination
 - Transparent integration
- **GA is prepared to serve community as “integrator”, leveraging unique experiences:**
 - Private company hosting national user facility
 - Stewardship of research programs
 - Demonstrated taking solutions to scale



***Our top priority is to ensure that the US community succeeds with fusion!
Contact Brian Grierson to join our growing effort***

We Are Getting Going NOW!

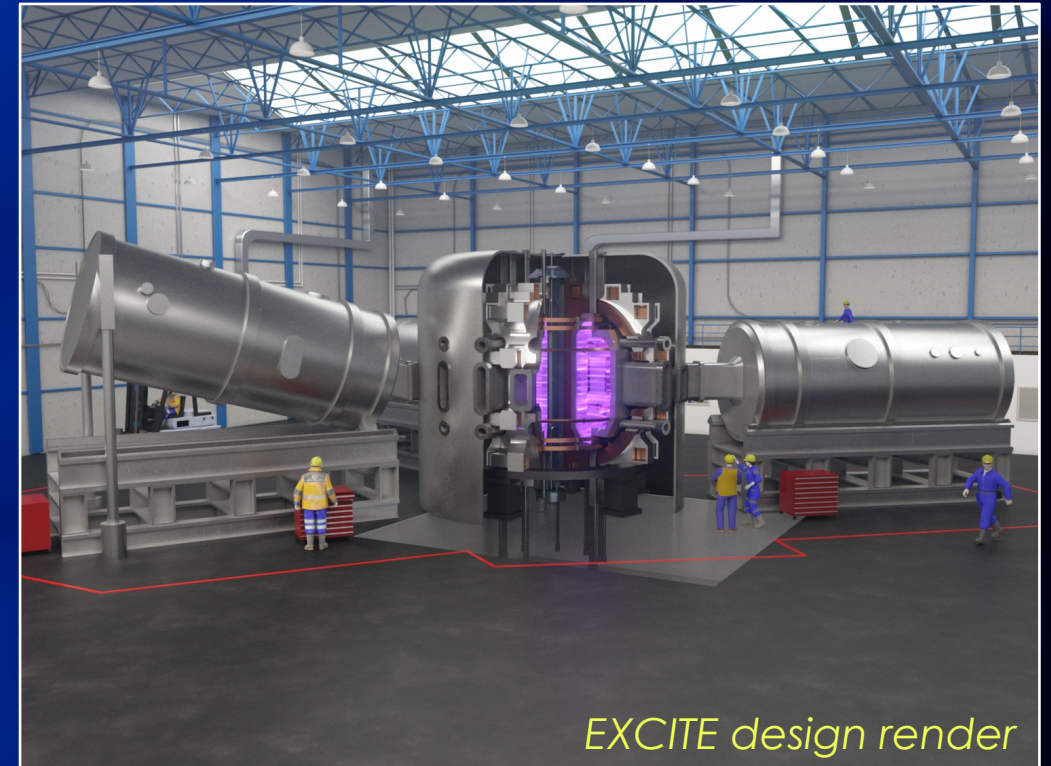
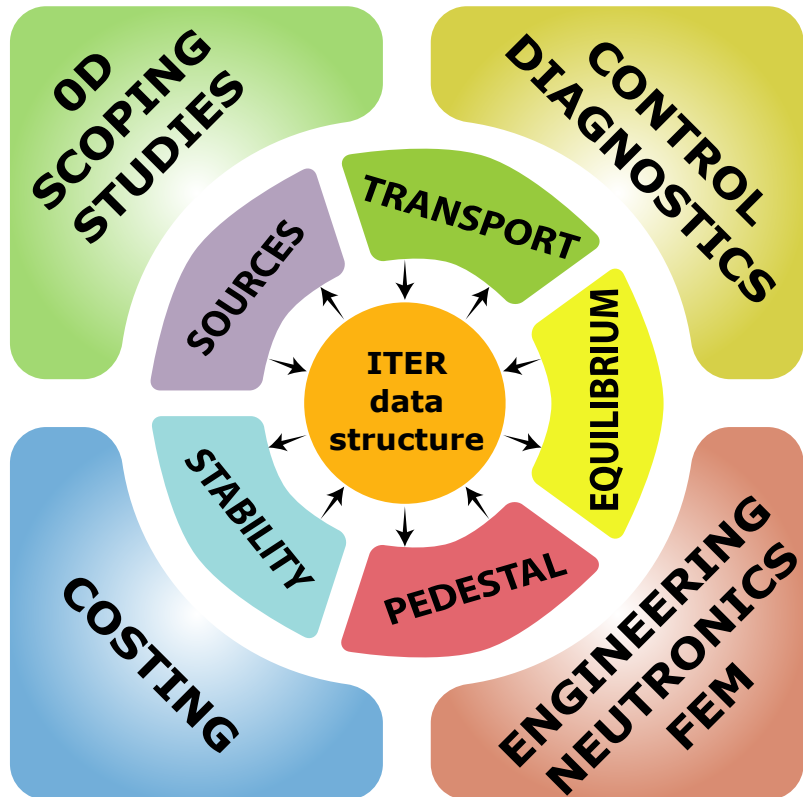
Internal Investments Supporting the Development of Fusion Pilot Plants



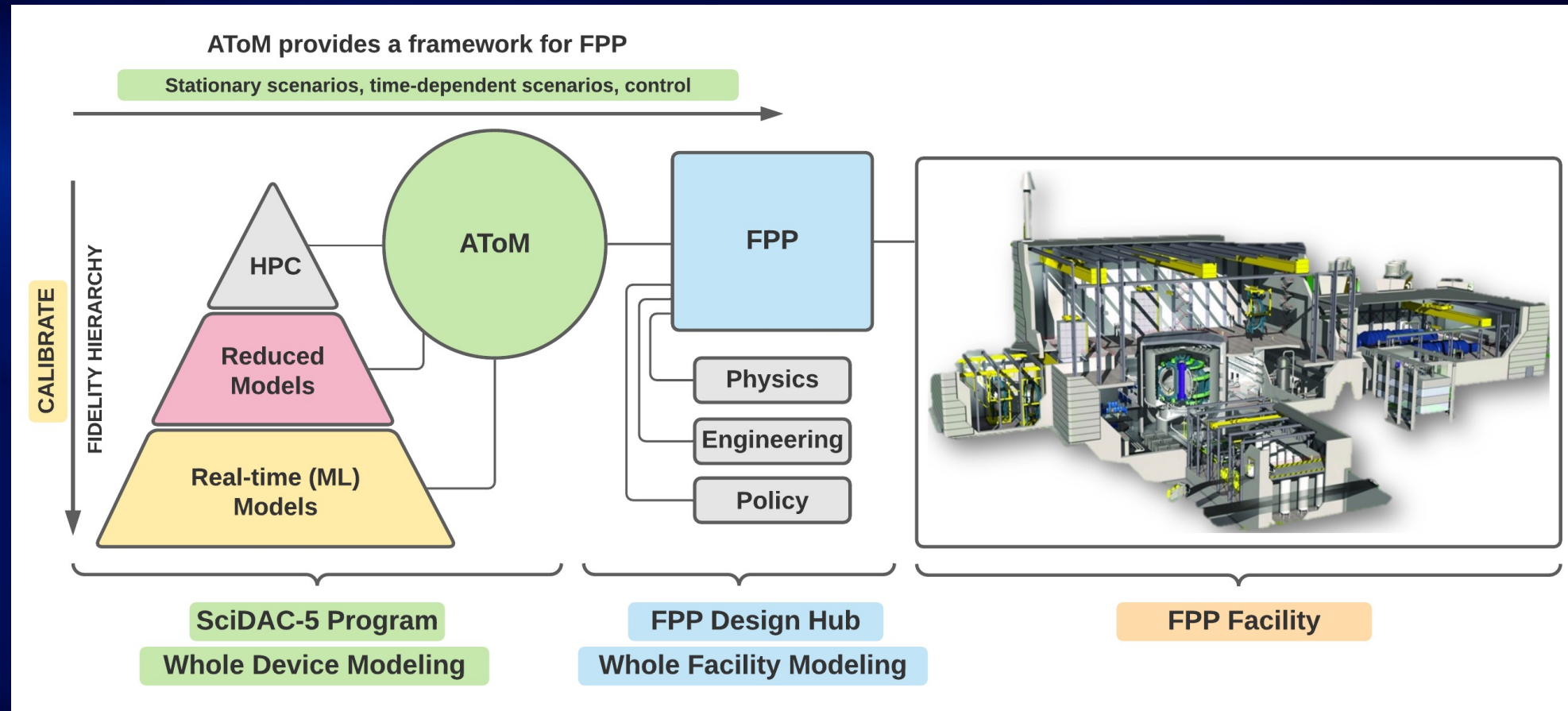
GA Is Devoted to Rapidly Producing Designs for FPPs and Developing Streamlined Workflows

1. Develop tools for rapid design optimization

2. Develop attractive conceptual designs for FPP



Evolution of AToM (SciDAC-5) Is Conceived to Service FPP Designs with Integrated Model Validation and Whole Device Modeling



- Extend AToM framework to “Whole Facility Modeling” by incorporating system codes, engineering analysis, measurement and control requirements, policy considerations etc as needed for an FPP design

We Remain Strongly Committed to the Success of ITER and Maintain a Significant Emphasis Across Our Programs

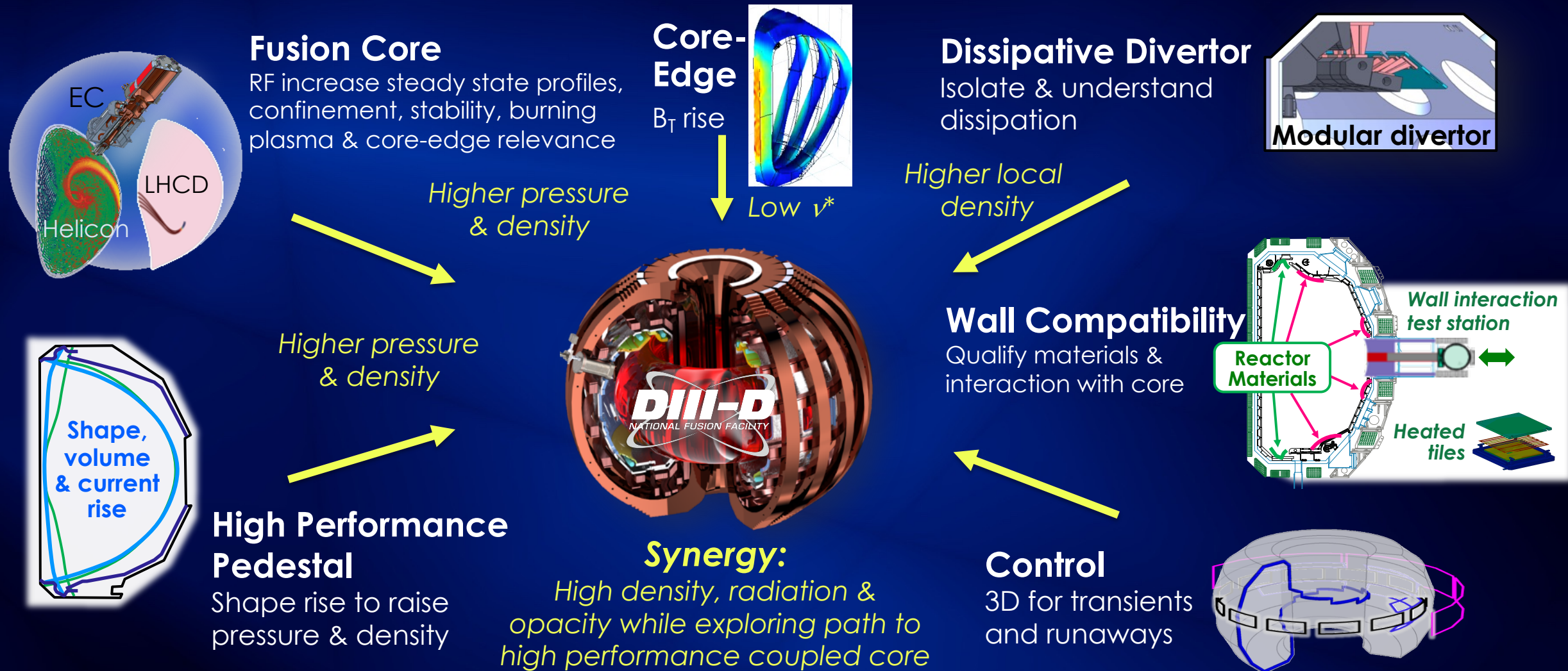
Poway
Jun 18

**CS Modules
shipped to ITER**

At ITER,
Sep 9

- **Time to grow US ITER research team (USIRT)**
 - Pulse Development Environment & simulation
 - Simultaneously build relevant infrastructure
- **The USIRT will benefit from remote sites to collaborate and participate in ITER**
- **GA seeks to host such a remote site**
 - Close proximity to DIII-D
 - Remote data handling, serving, and analysis
 - Experience hosting a multi-institutional team

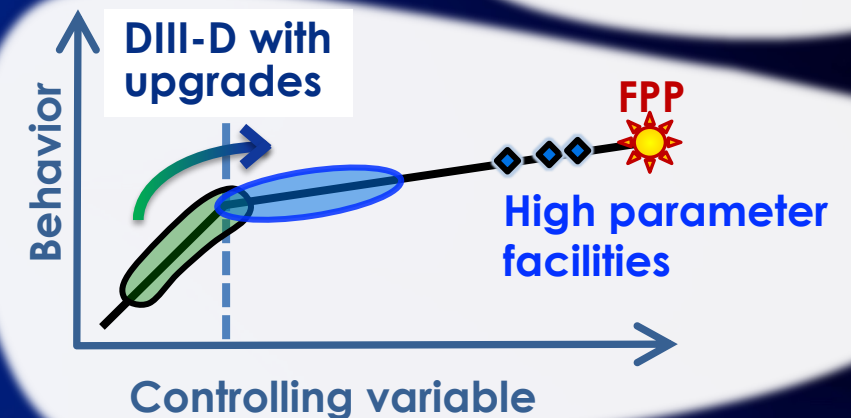
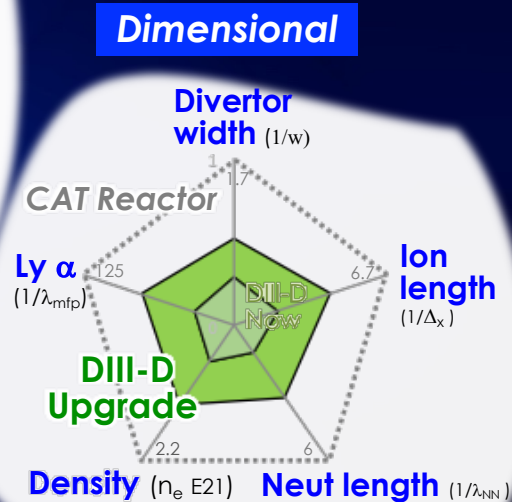
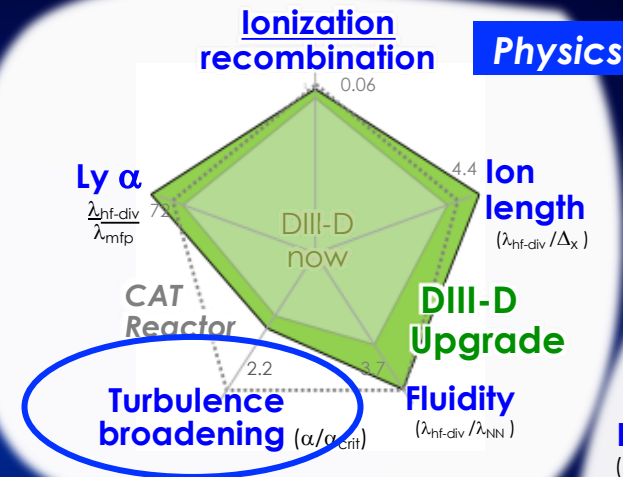
Upgrades to DIII-D Will Deliver a Powerful Platform to Expeditiously Answer Critical Issues for FPP and ITER



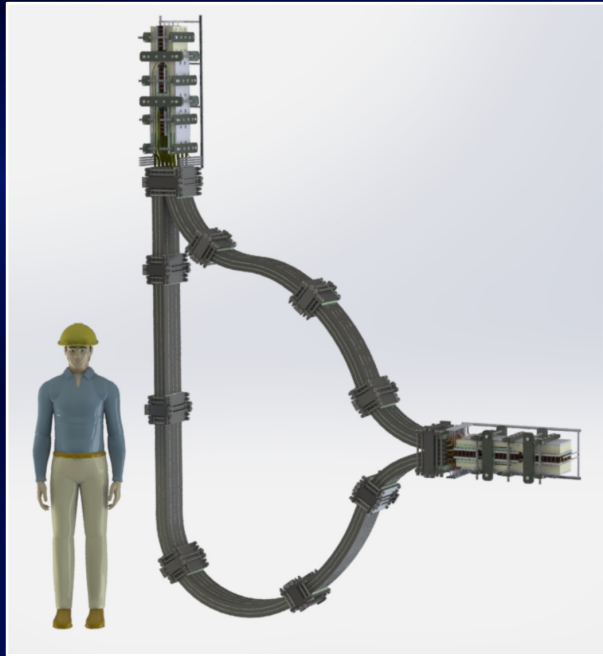
DIII-D Provides a Rapid and Cost-Effective Path to Addressing the Integrated Tokamak Exhaust & Performance Gap TODAY

- **FESAC plan calls for DIII-D to address gaps**
 - Key to preparation for ITER, disruptions, transients, steady state, PFC integration
- **Upgrades allow access to FPP regimes**
- **Validated models provide connection to FPP**
 - Assess interactions in relevant conditions
 - High flexibility & diagnosis
 - Rapid innovation cycle

Rapid progress possible in partnership with worldwide tokamak fleet



Internal Efforts Support the Development of Magnet Technologies that Will Simplify and Enhance FPP Designs



- **Developing concepts for HTS demountable toroidal field coils**
 - Allows replacement of fusion plant components
 - Prototype fabrication and testing is in work, INFUSE with LBNL
- **Non-planar HTS magnet development**
 - Fabricated using in-house 3D printing capabilities
- **Robust magnet designs operating close to margins**
 - Enabled by sophisticated modeling and simulation tools
 - 3D adaptation of established 2D codes

MFE efforts leverage the full strength of GA's technology and engineering capabilities

GA Is Developing ITER and FPP Diagnostic Technologies

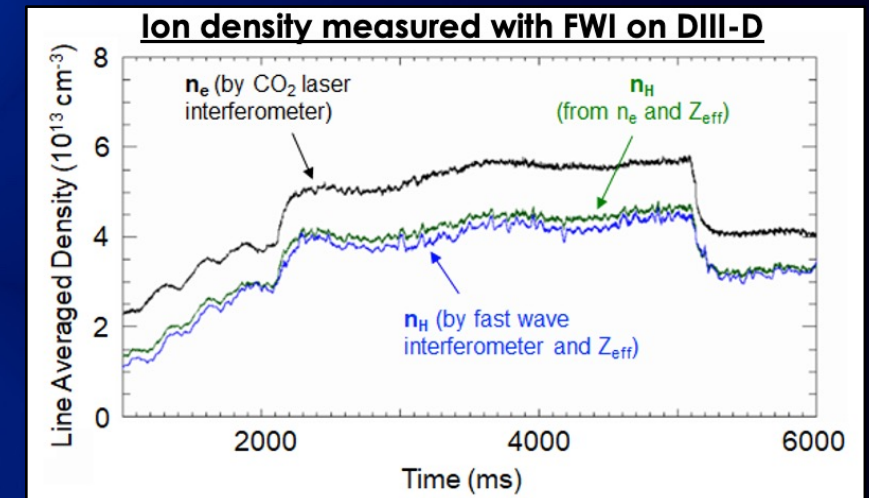
- **Technical challenges to meet reactor requirements**
 - High radiation, limited access, maintenance, ... etc
- **GA developing cutting-edge diagnostics for ITER**
 - Toroidal Interferometer Polarimeter (TIP)
 - Low Field Side Reflectometer (LFSR)
 - Wide Angle Viewing System (WAVS)
- **GA FPP diagnostic development targeting**
 - Plasma control requirements
 - Use of proxy measurements
 - Real-time algorithms with synthetic diagnostics

DIII-D is a perfect test bed for next step diagnostics



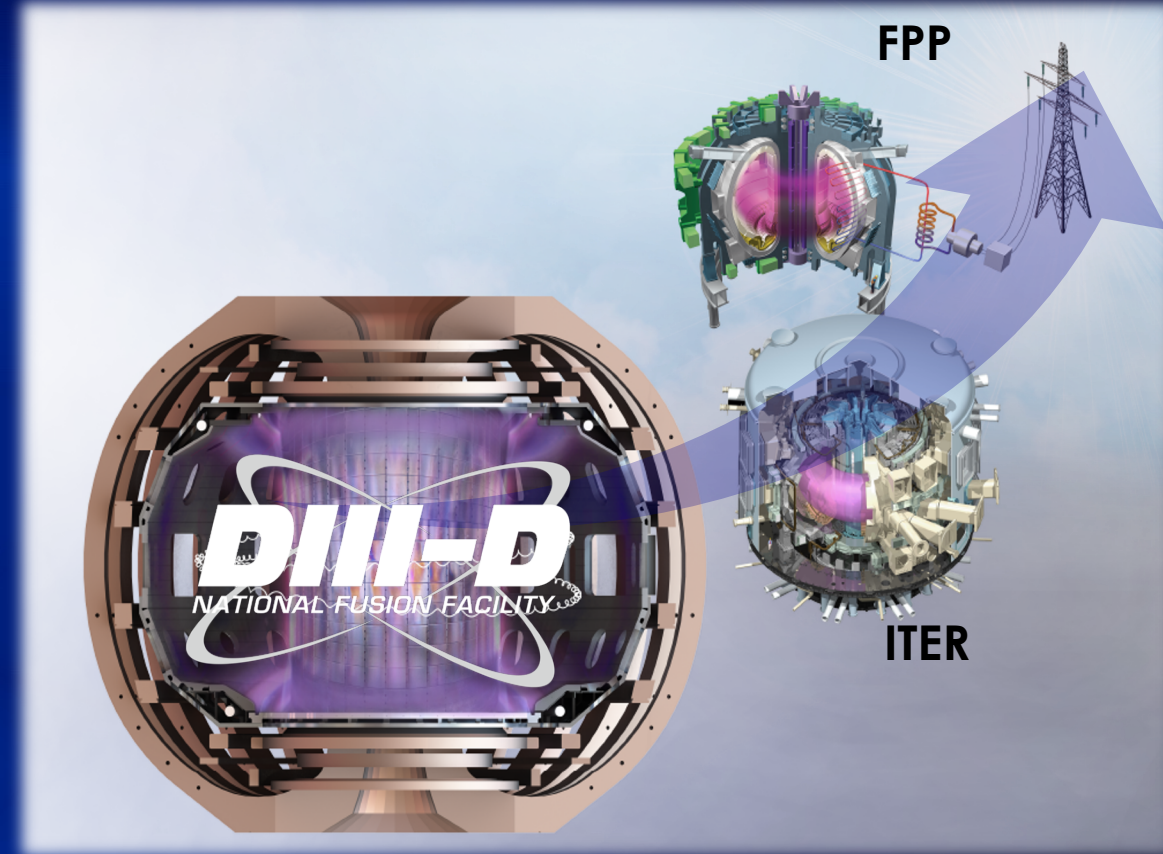
ITER Toroidal Interferometer Polarimeter (TIP)

Validation of Fast Wave Interferometer (FWI)



General Atomics Welcomes Strong Community Engagement to Deliver Fusion Power to the Grid

- **We are eager to move forward with the community plan**
 - Pivoted our efforts to highest priority issues that can be addressed now
- **We are investing to establish collaborative hubs to involve community**
 - FPP design
 - US ITER research team



Come join us to make fusion power a reality