



# WPSA Enhancements KoM: FILD Update

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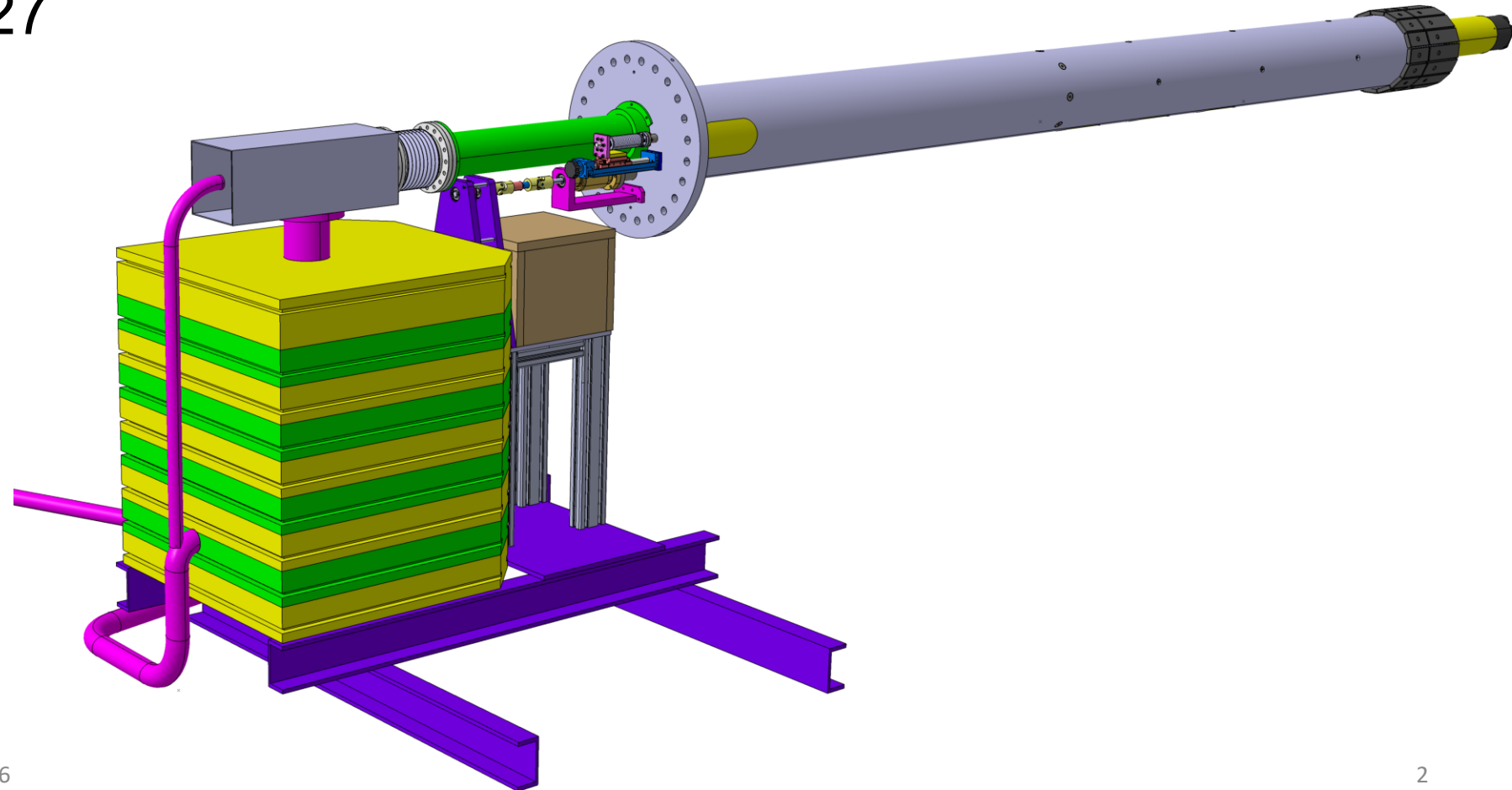


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ENERGY**

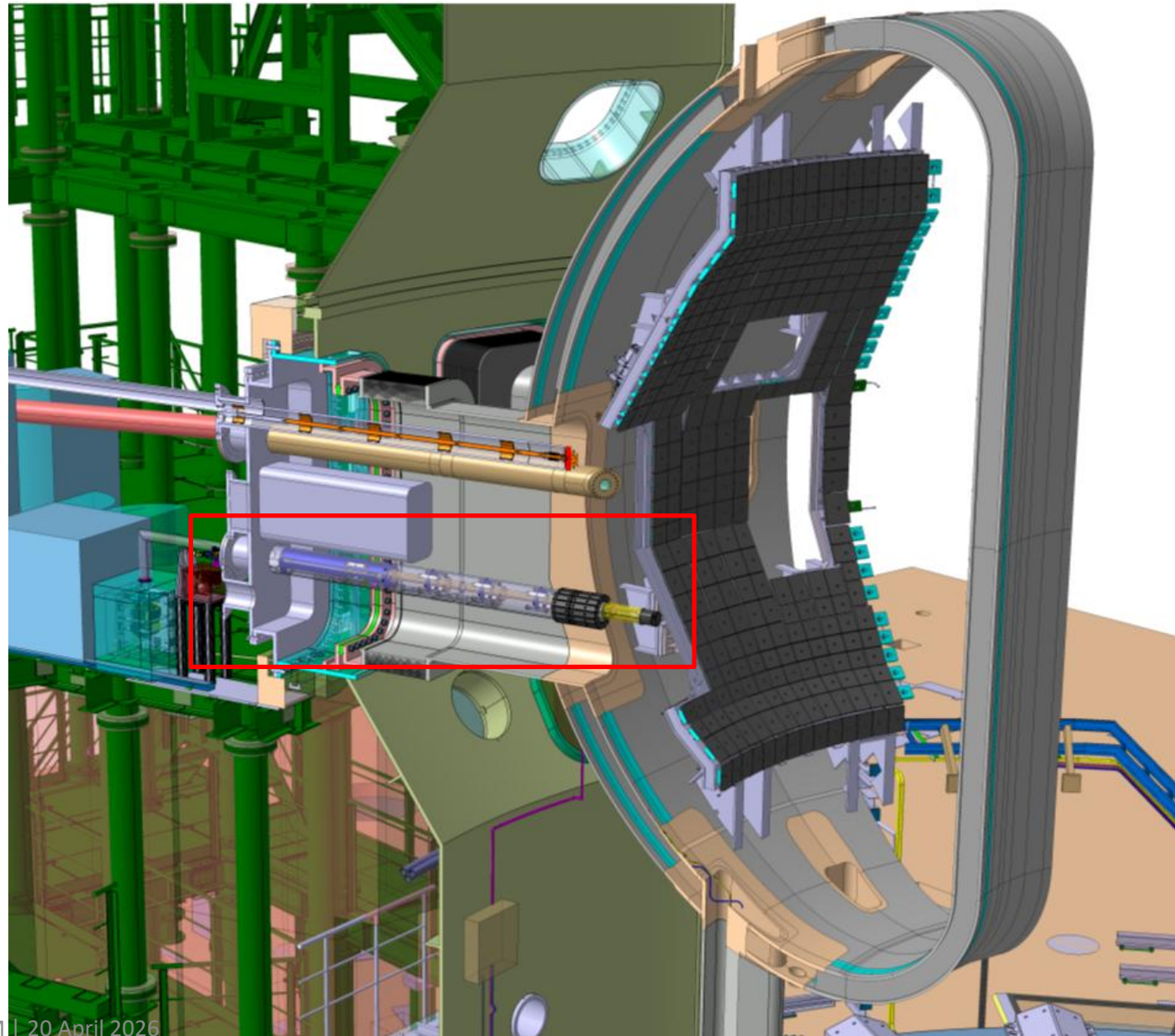


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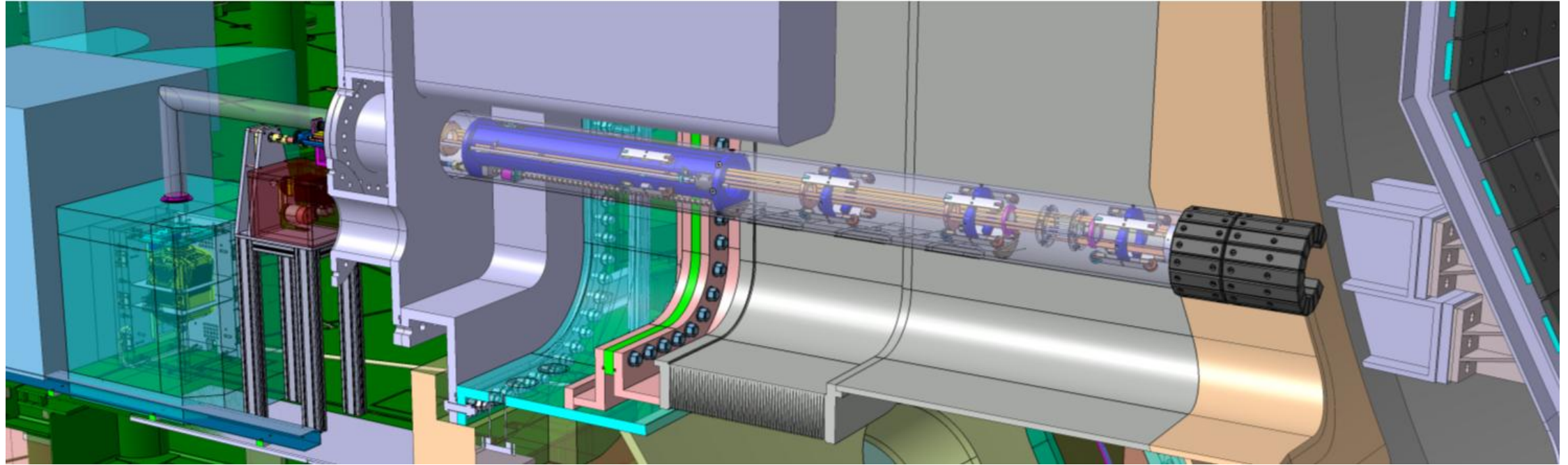
- Introduction
- FILD status overview
- Plans for 2026/2027



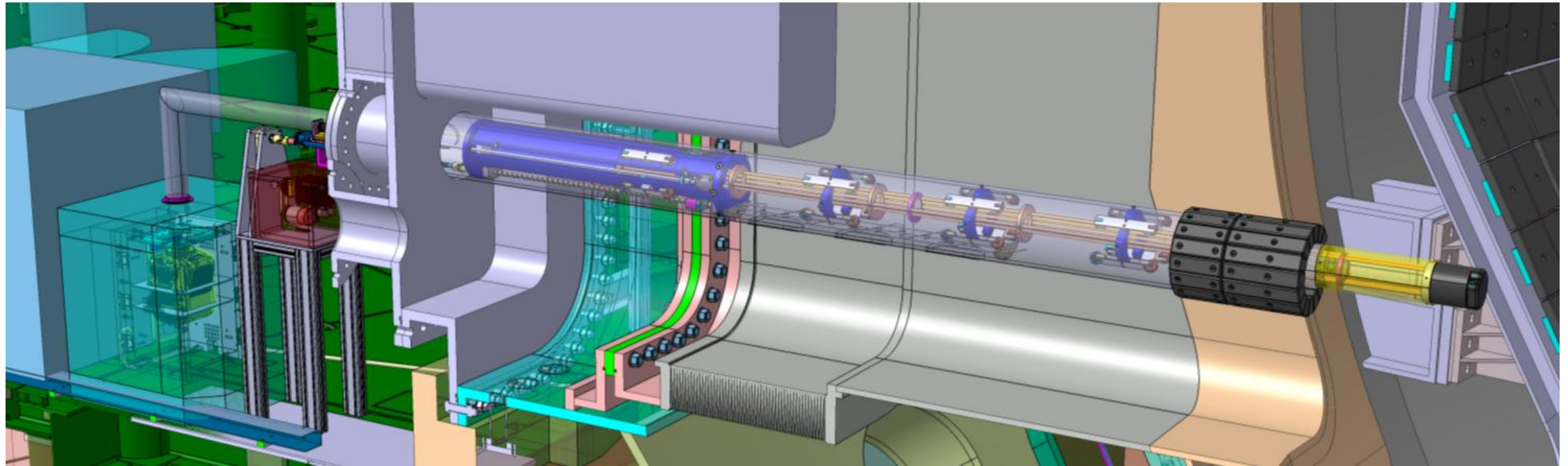
# FILD Located At Equatorial Port In Sector 18, Slightly Below Midplane



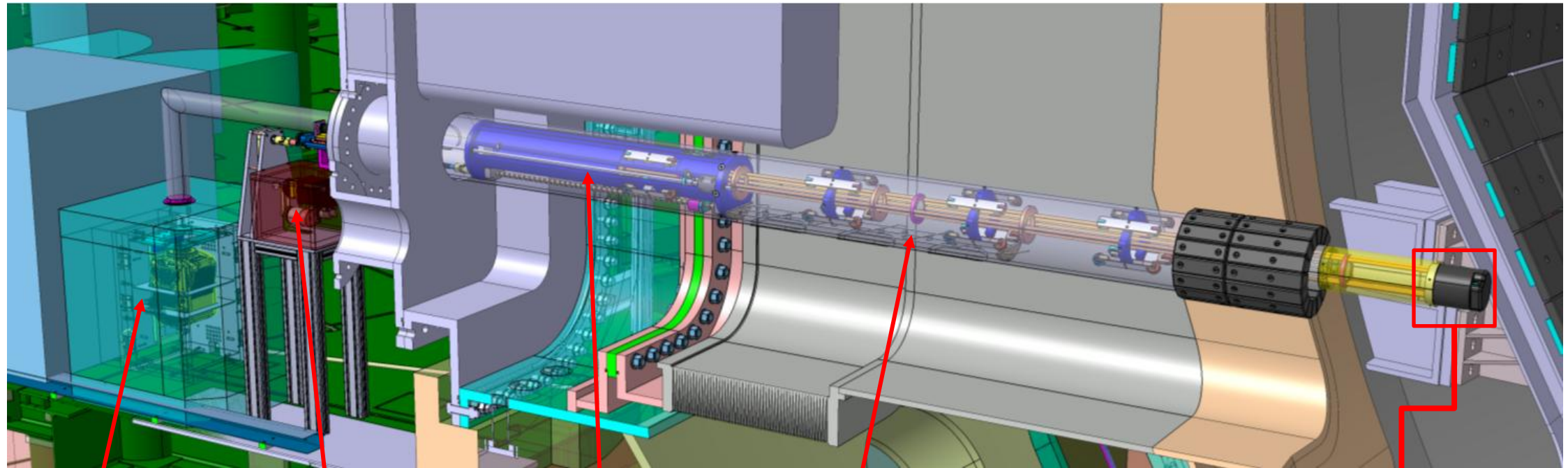
# FILD Displaces 0.7 m Stroke Moving Between Parking And Measuring Positions



# FILD Displaces 0.7 m Stroke Moving Between Parking And Measuring Positions



# FILD Head Collects Fast Ions Escaping From Plasma



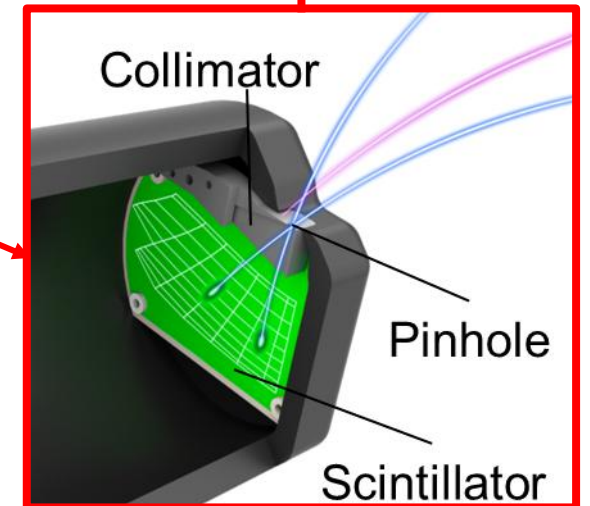
Light acquisition system

Motion drive unit

Motion guide system

Port plug

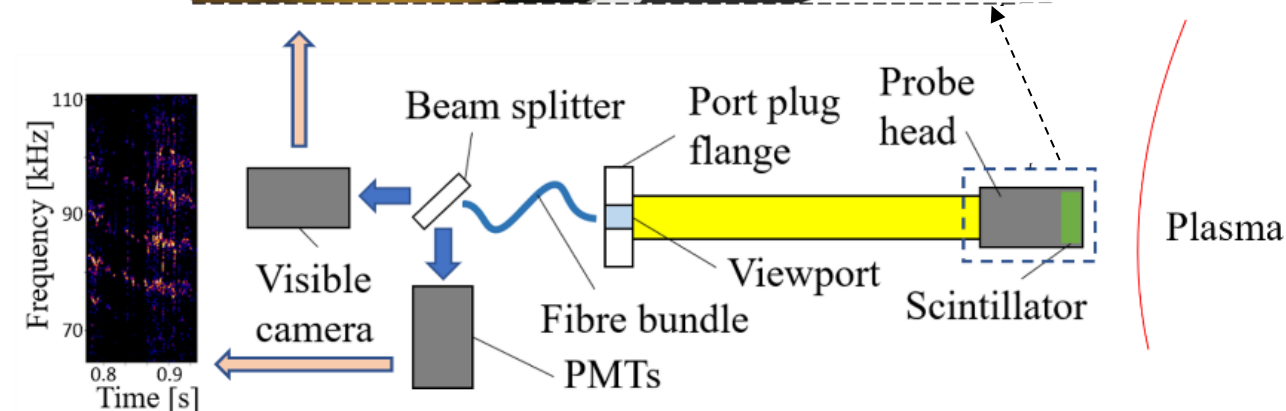
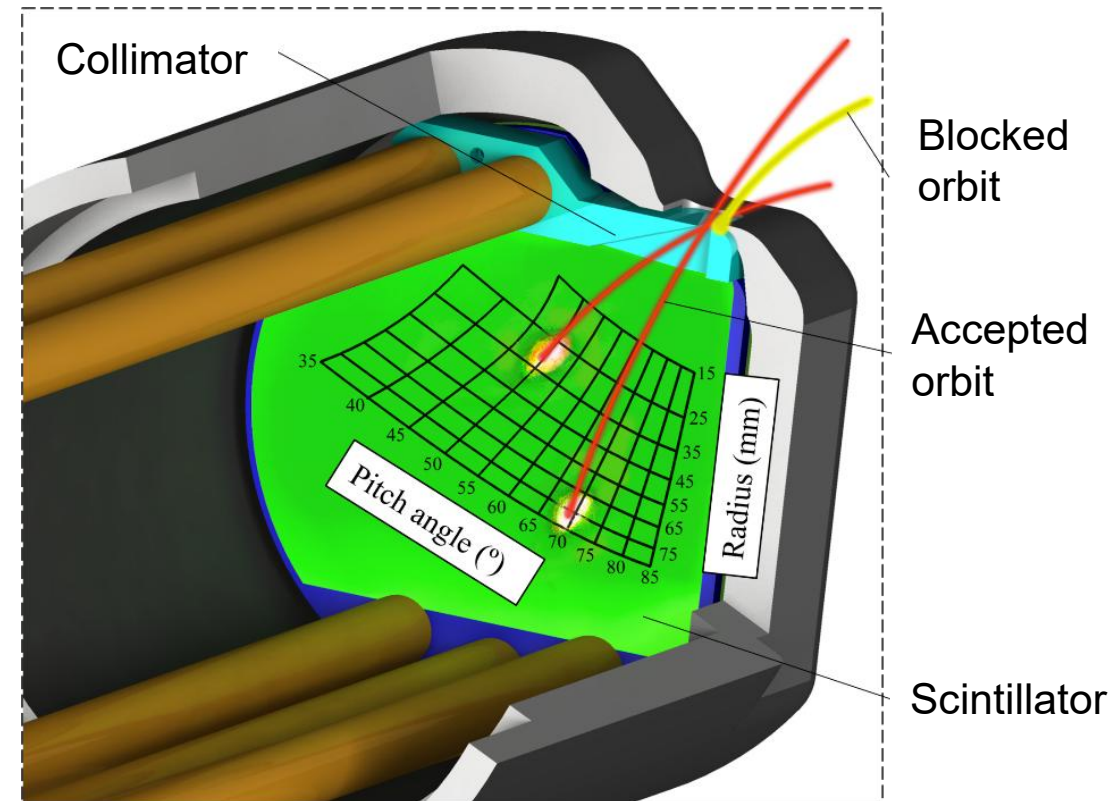
Probe head (measuring)



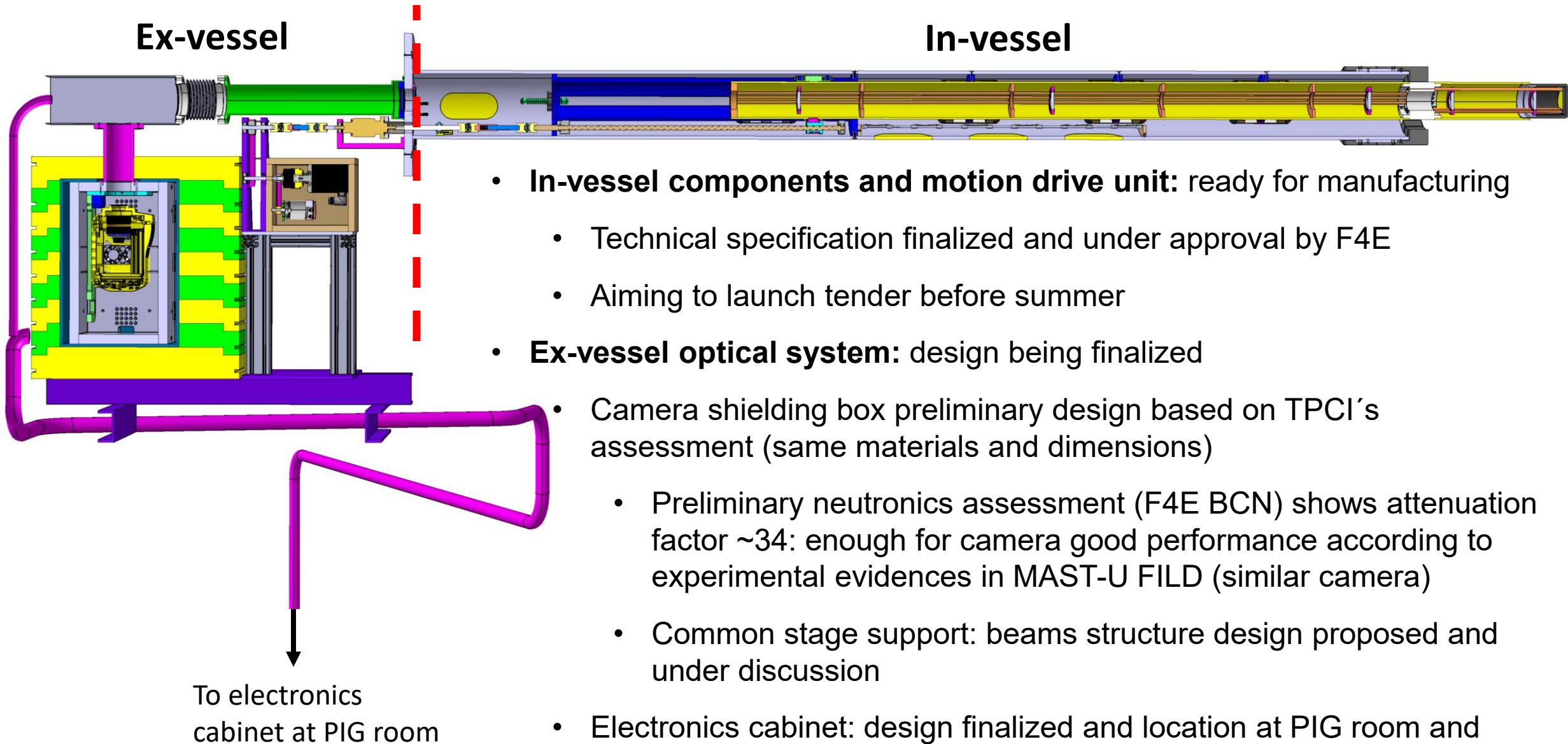


# FILD Head Collects Fast Ions Escaping From Plasma

- FILD used in all major devices to **study fast ion losses**
- Works as a magnetic spectrometer **collimating and dispersing ions onto a scintillator plate**
- Strike points on the scintillator plate depend on **particle gyroradius and pitch-angle**
- FILD provides **local time-resolved energy and pitch angle measurements** of escaping ions
  - **CCD camera:** High spatial resolution
  - **Energy range:** 25-500 keV (15-170 keV resolution)
  - **Pitch angle range ( $v_{\text{perp}} / v_{\text{tot}}$ ):** 30°-75° (5° resolution)
  - **PMTs system:** High temporal resolution (up to 1 MHz)
- Allows studying **transport mechanisms provoking fast ion losses**



FILD working principle





- **In-vessel components:**
  - Completion of technical spec review with F4E (already started)
  - Finalize preparation of paperwork with Univ. of Seville (already started)
  - Launch public call before summer and selection of candidates (with F4E)
  - KoM for starting manufacturing and contract monitoring (regular meetings)
- **Ex-vessel components:**
  - Agree on final design with QST and F4E (already under discussion)
  - Launch public calls for:
    - Ex-vessel mechanical components manufacturing
    - Light acquisition system (optics, camera and electronics for PMTs)
- **Vacuum chamber for acceptance tests:** design being discussed with F4E
  - Complete design and launch manufacturing during 2026
- **New postdoc (Lina Velarde)** joining the FILD Team: experience in MAST-U FILD - PhD completing installation of FILD, operating the system in different campaigns and analysing the results

