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Torus Vacuum Pumping System

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NSTX NB Upgrade Peer Review
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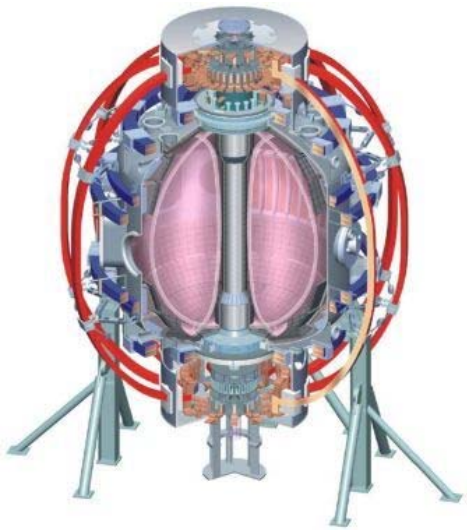
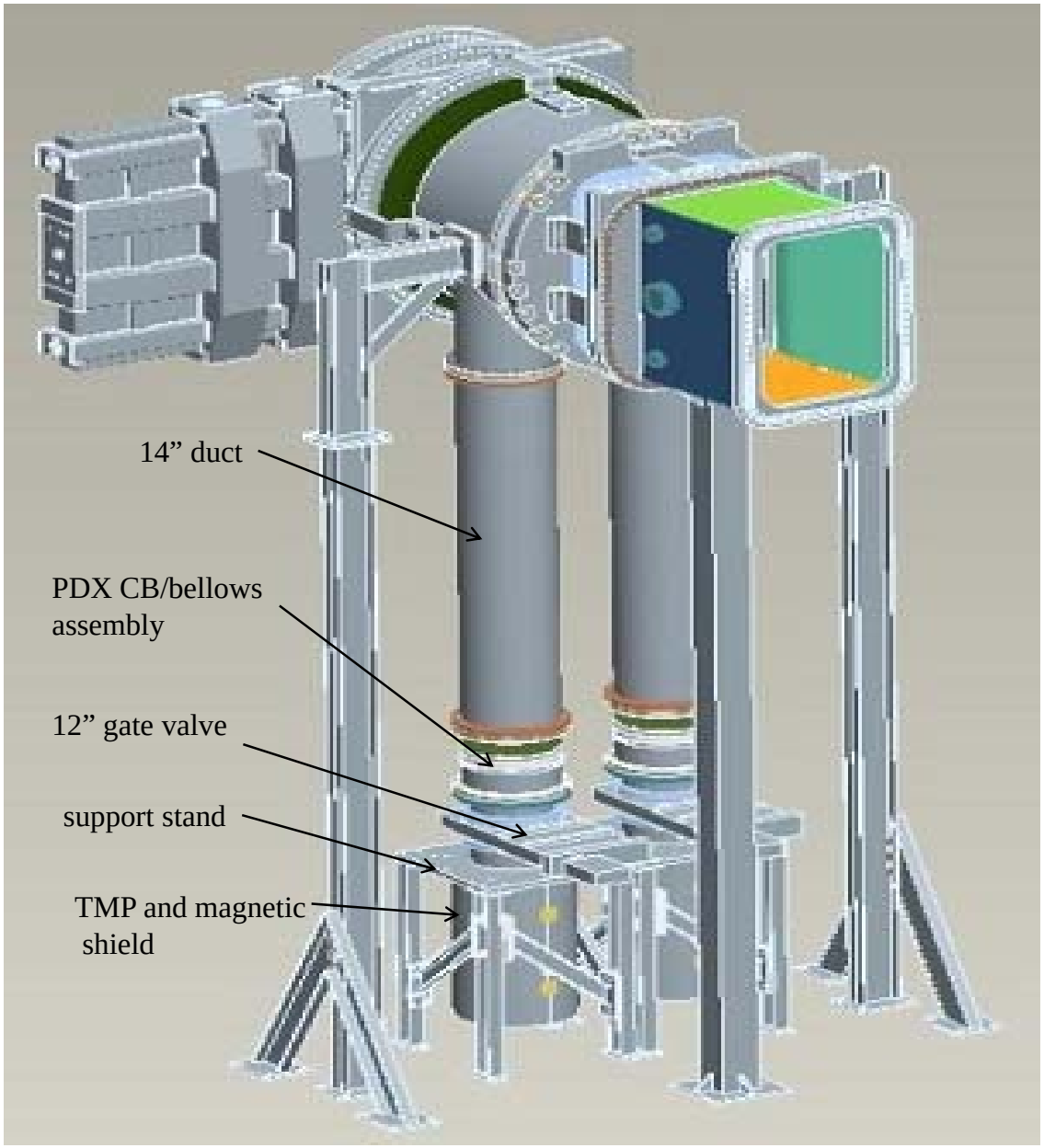


TVPS

- TMPs
  - placed near TC floor to minimize the effects of the magnetic field
  - 2650 l/s pumping speed

- Magnetic shields:
  - ½" thick low carbon steel cylinders
  - shields extends 6" above/below TMPs
  - reduce the field to below 50 gauss

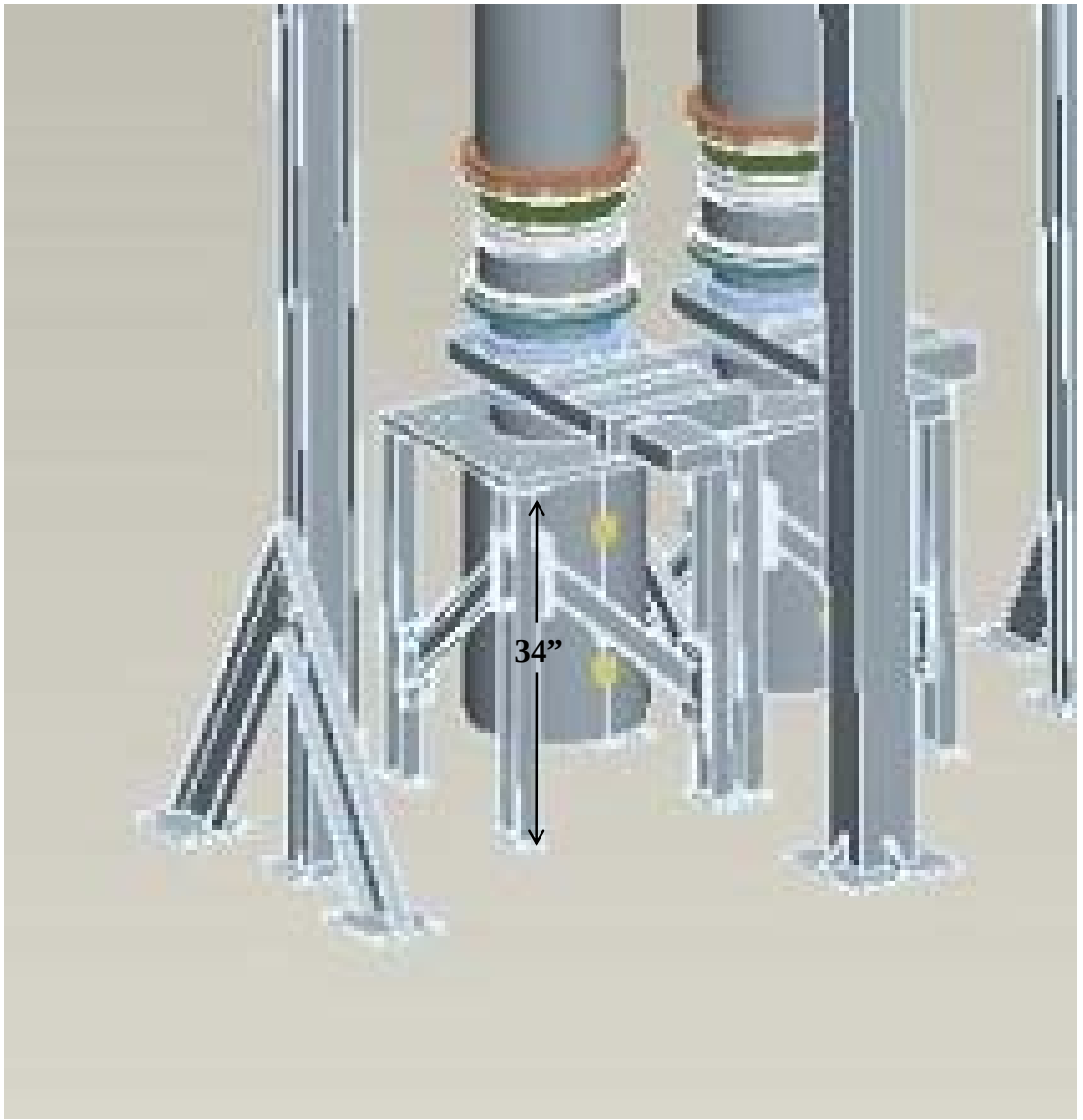
- Calculated effective pumping speed is approximately 1900 l/s



TMP Support Stand

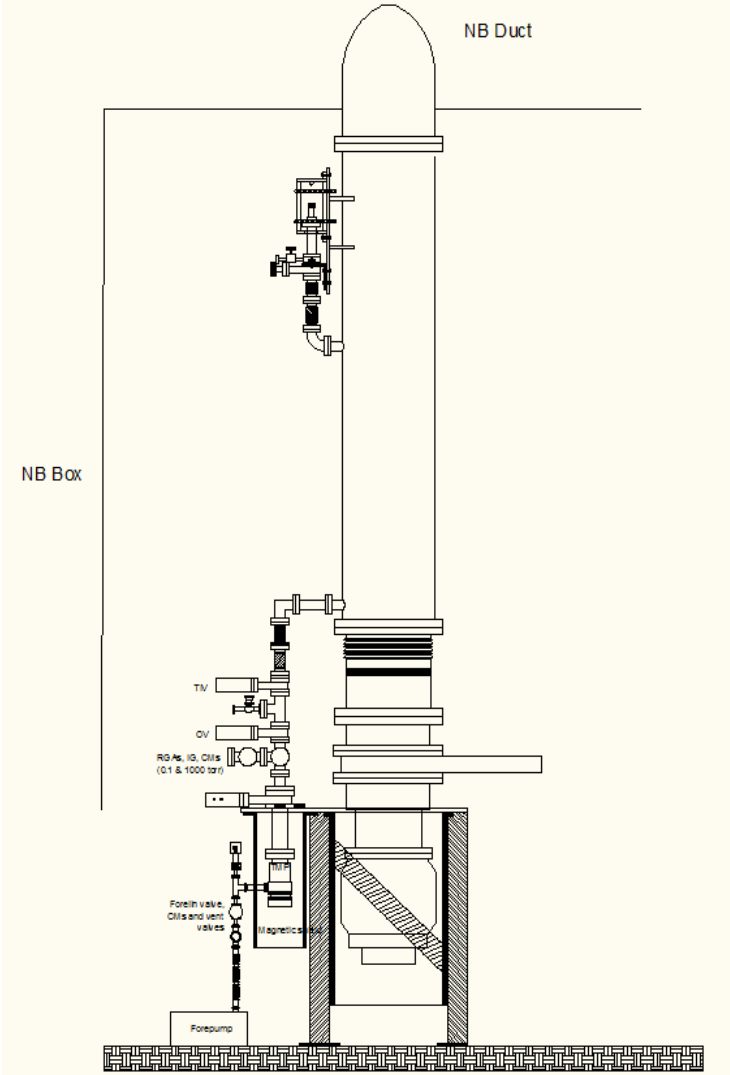
- Support stand assembly for various loads:
  - Approx. 1200 lbs from vacuum
  - less than 50 lbs from magnetic forces
  - Approx 5700 ft-lbs torque for worst case TMP failure

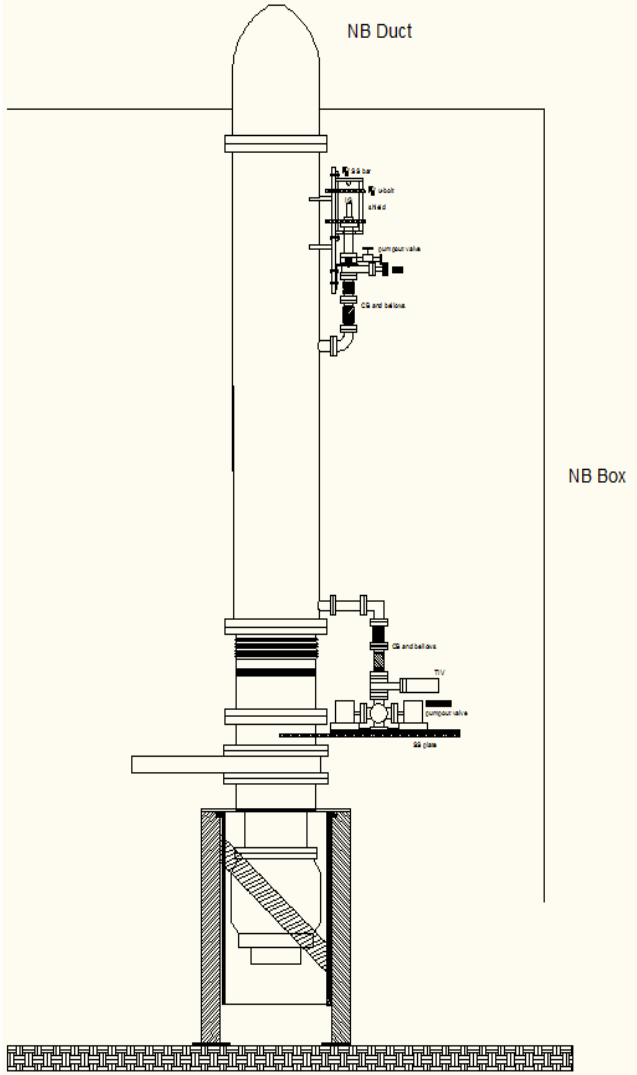
- Support stand:
  - 3” square aluminum tubing bolted to 24” square SS plate
  - cross braces with electrical isolation



RGA and Gauging Overview

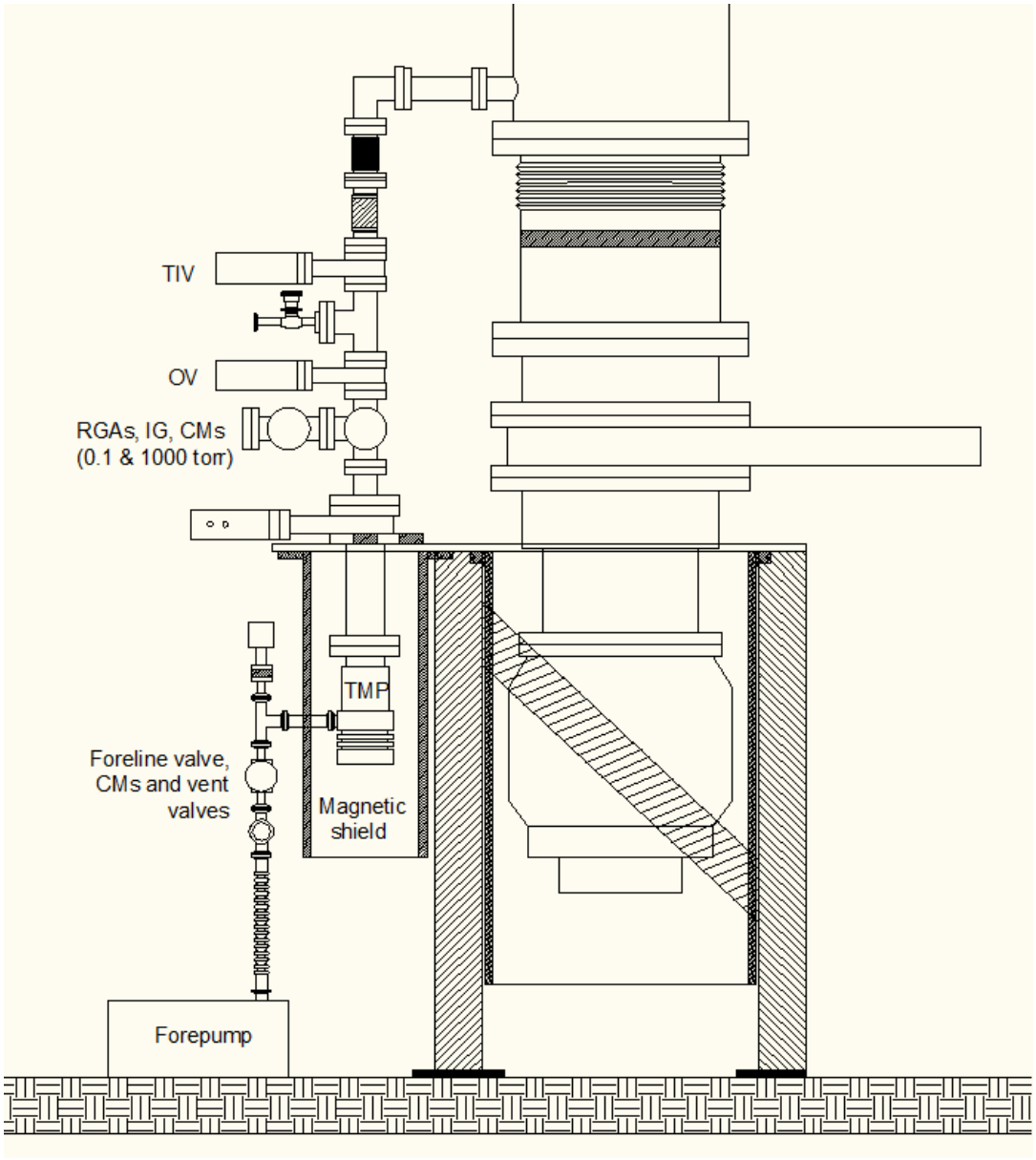
- Ion gauge assembly on each pumping duct
- RGA system and CM each on separate ducts
- All assemblies located between the ducts and the NB box





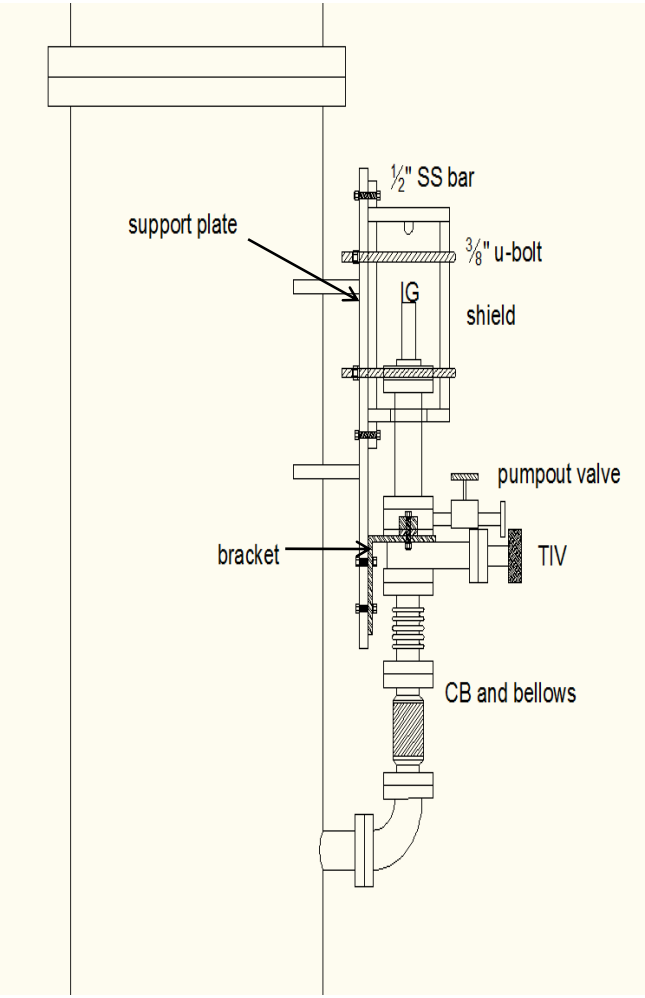
RGA System

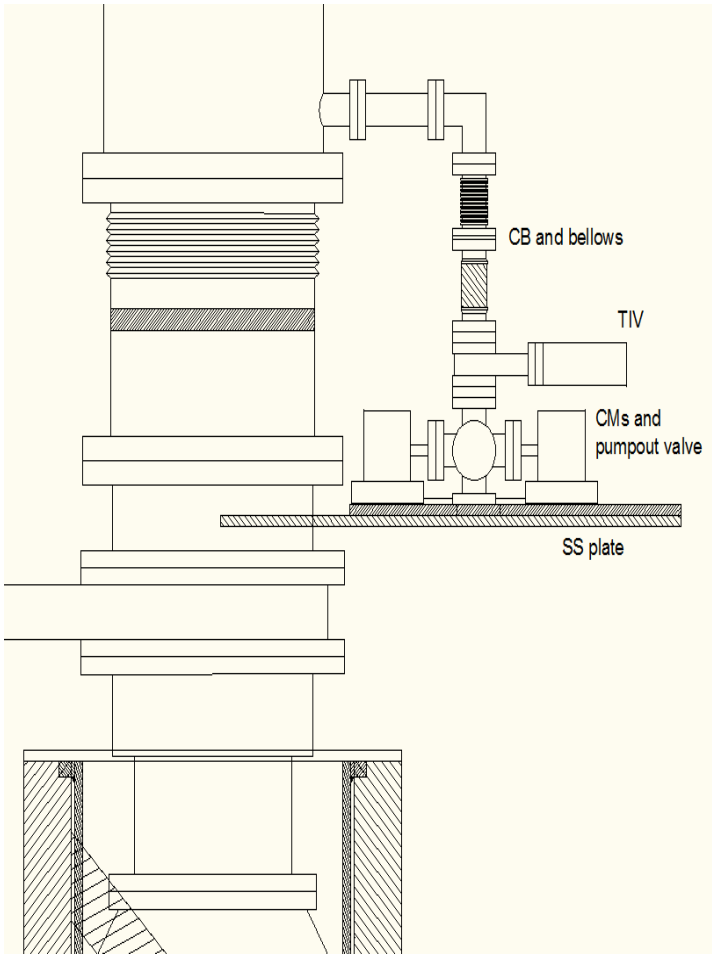
- Reuse of most of the existing equipment
- Same differentially pumped configuration as exiting system on NSTX
- RGA assembly :
  - TMP and forepump
  - CB and bellows
  - interface , orifice and TMP isolation valves
  - ion gauge and CMs
  - Two RGAs for trend monitoring and after shot outgassing
- Small TMP will also be shielded from magnetic fields
- Same capabilities for measurements across a wide range of pressures



Gauging

- Two ion gauge assemblies and one CM assembly
- CM assembly :
  - CMs used for pumpdown, calibrations and GDC
  - CB/bellows assembly
  - pumpout and isolation valve
  - SS support plate
- Ion gauge assemblies :
  - miniature ion gauges
  - CB/bellows assembly
  - pumpout and isolation valve
  - low carbon steel shield cylinder
  - SS brackets and support plate welded to duct
  - Shields u-bolted to support plate
  - Separate bracket to hold and isolate ion gauge





Summary

- Overall design of TVPS and monitoring systems are complete
- Magnetic field reduced to less than 50 gauss
- Effective pumping speed ~1900 l/s
- RGA system configuration similar to existing system