

# **P. O. Box Contaminants that may Originate in the Source Chamber**

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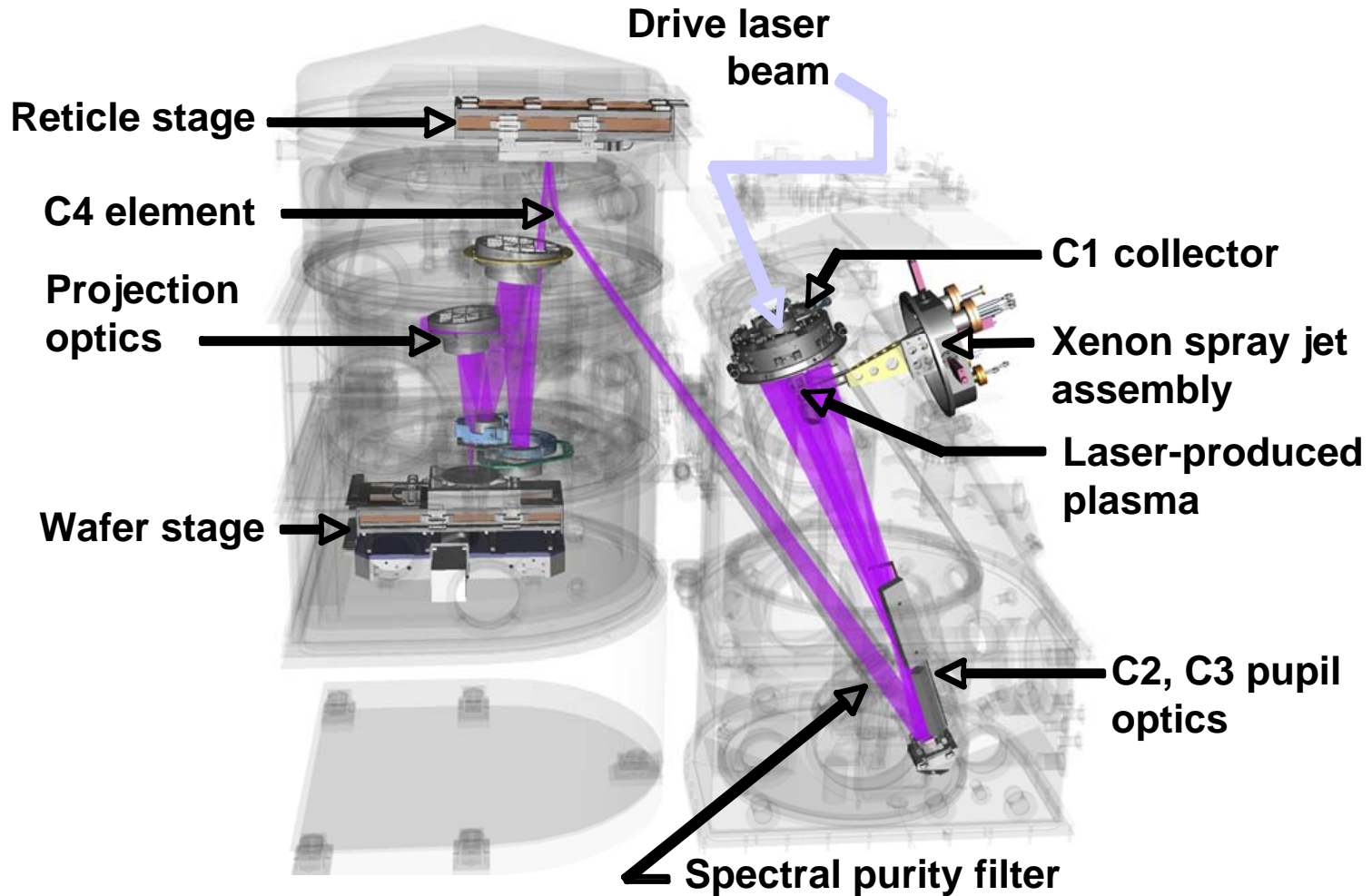
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**Support for this work provided by International SEMATECH LITH160**

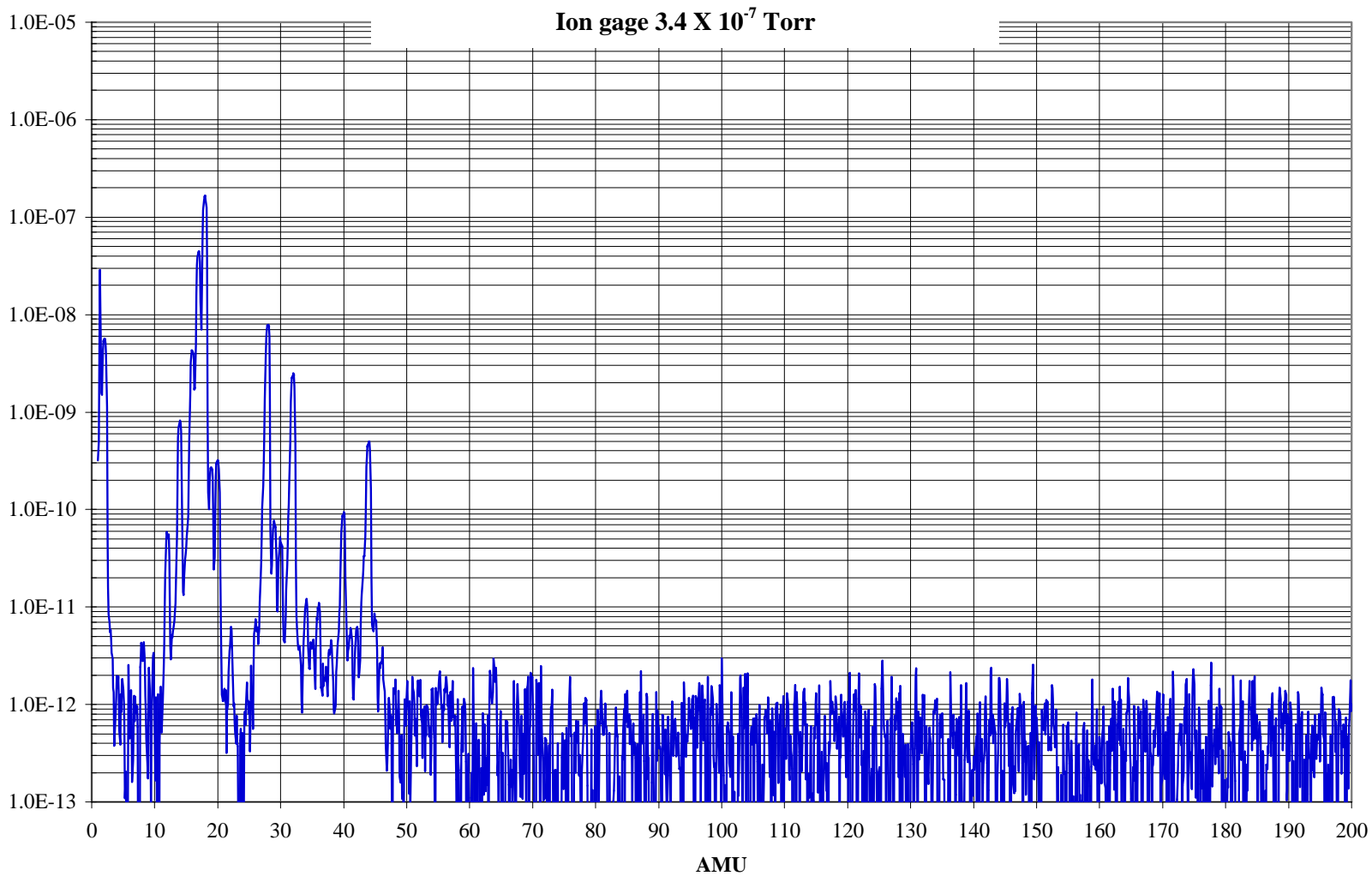
# Outline

- Remember ETS
- Source chamber and Main chamber environments
  - The spectral purity filter
- Considerations of possible source chamber environments going forward
  - Xenon target
  - Tin target
  - Lithium Target
- Conclusions

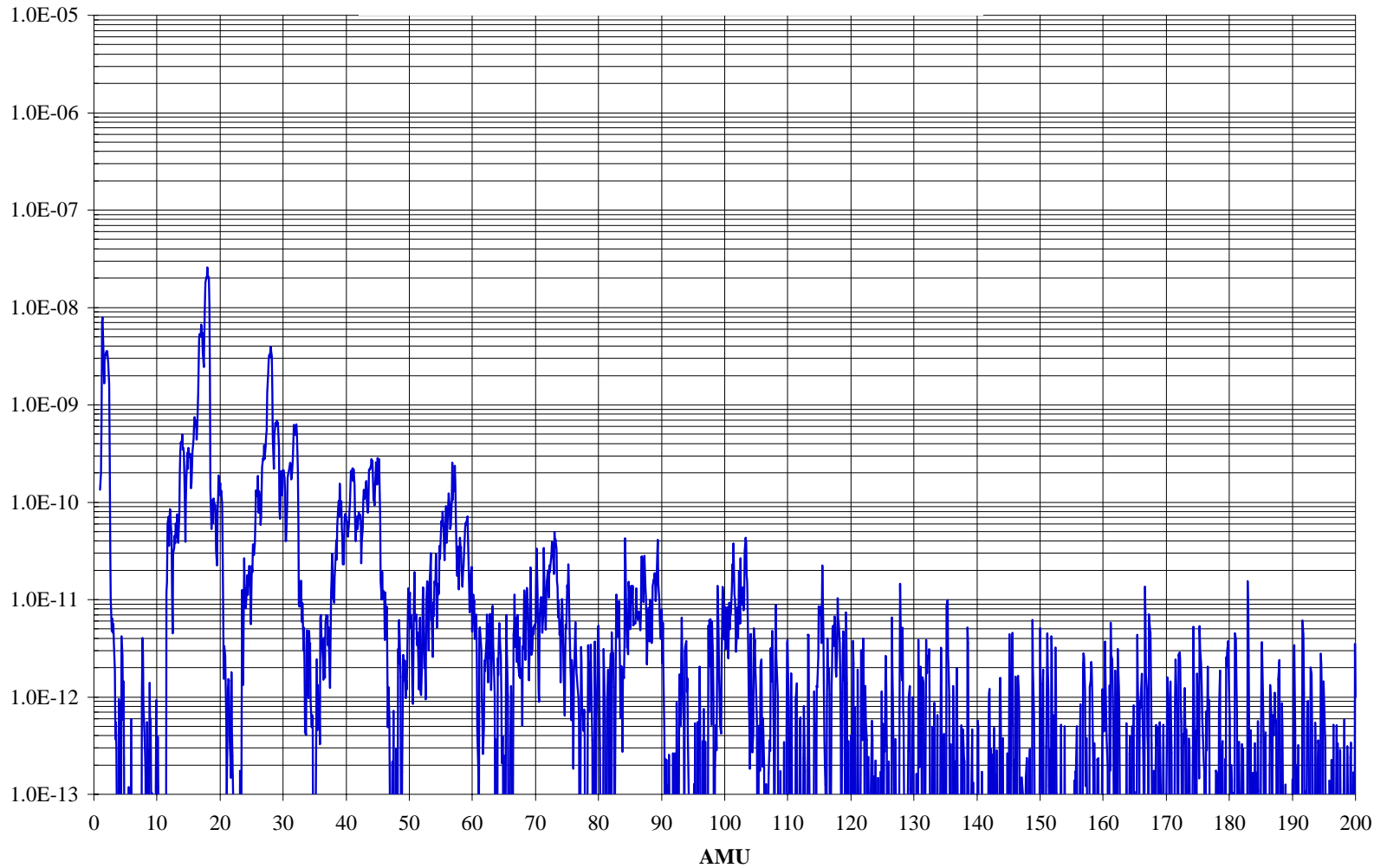
# ETS Mechanical Layout



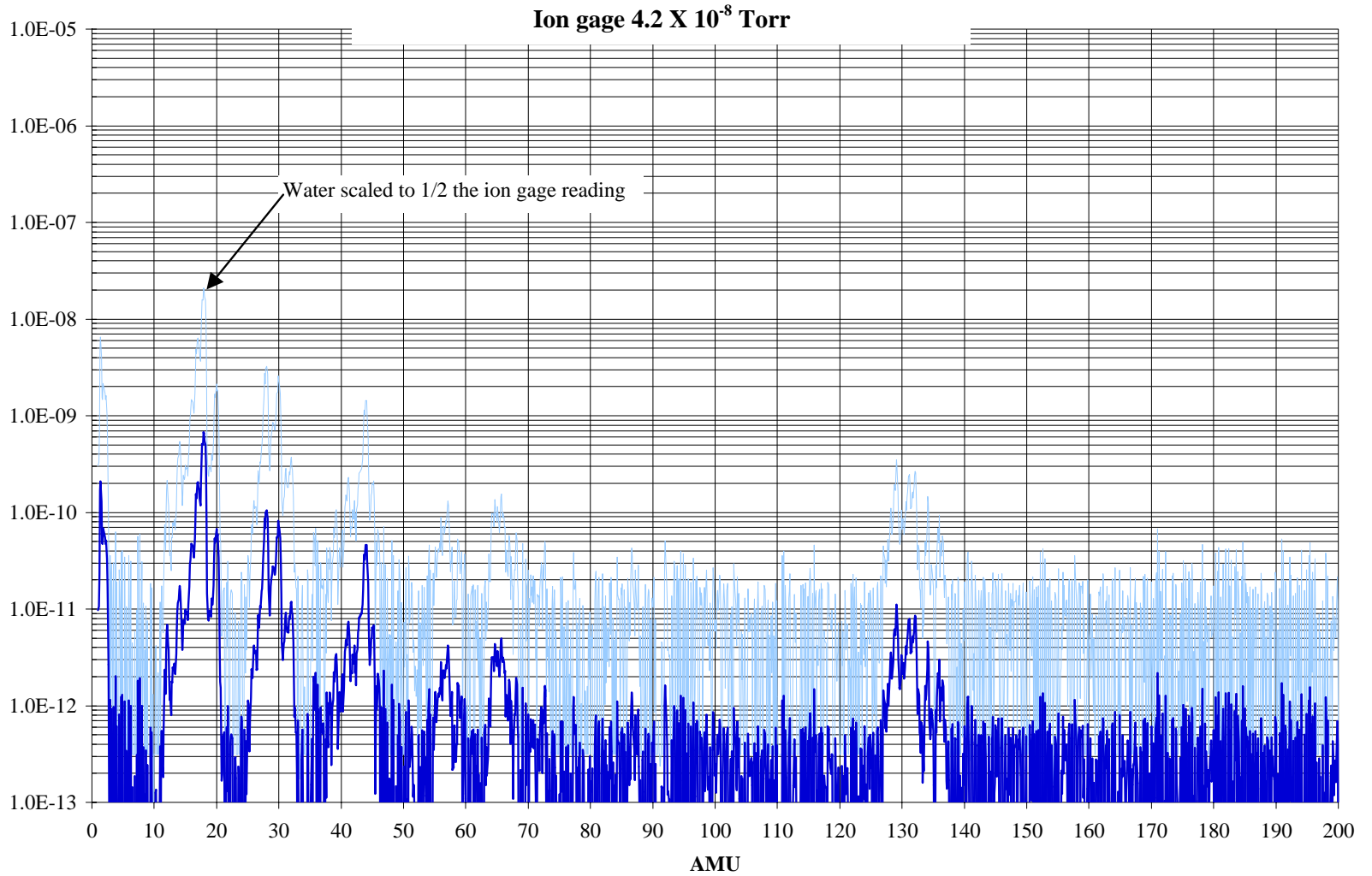
Main chamber background spectrum 11-15-2001 9:29am



Source chamber background spectrum 9-18-2001 11:08a



### Source chamber background spectrum 10-22-2001 1:00p



# ETS Source Environment

- The LPP target was always clean xenon or a xenon/argon mix.
- Background water level  $10^{-7}$  torr or less
- Most contaminants were hydrocarbons introduced by diagnostics (cabling, etc.), at low levels (see RGA traces), whose mobility into the main chamber was limited by the spectral purity filter.

# Metallic target (tin, lithium)

- With no spectral purity filter or mitigation of inter-chamber diffusion:
  - For a tin LPP or DPP target, the metal itself may have some vapor pressure in the P. O. chamber.
  - If the target is delivered as a volatile species (stannane, tin tetramethyl) that molecule will have some presence in the P. O. chamber.
  - If the target is some sort of matrix containing the metal (oxide, water droplet, etc.) the matrix components will be ionized and will subsequently recombine to appear everywhere, including the P. O. chamber.
  - Any gas used to mitigate the fast ions, and any low-level contaminants in that gas, will appear in the P. O. chamber.



# Conclusions

- The source target material, any support matrix (and its decomposition products), and any gases (with their contaminants) used for fast ion mitigation, should be considered as potential contaminants in the P. O. chamber.
- This is especially true in the absence of a spectral density filter or other structure to prevent inter-chamber diffusion.