

Vacuum Science in ASTeC

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Main Areas of Work

- Design of Accelerator Vacuum Systems
- Operational support for SRS
- Collaborations
- Underpinning Research
 - NEG Coatings
 - Outgassing
 - Metrology
 - Vacuum Technology

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Accelerator Vacuum System Design

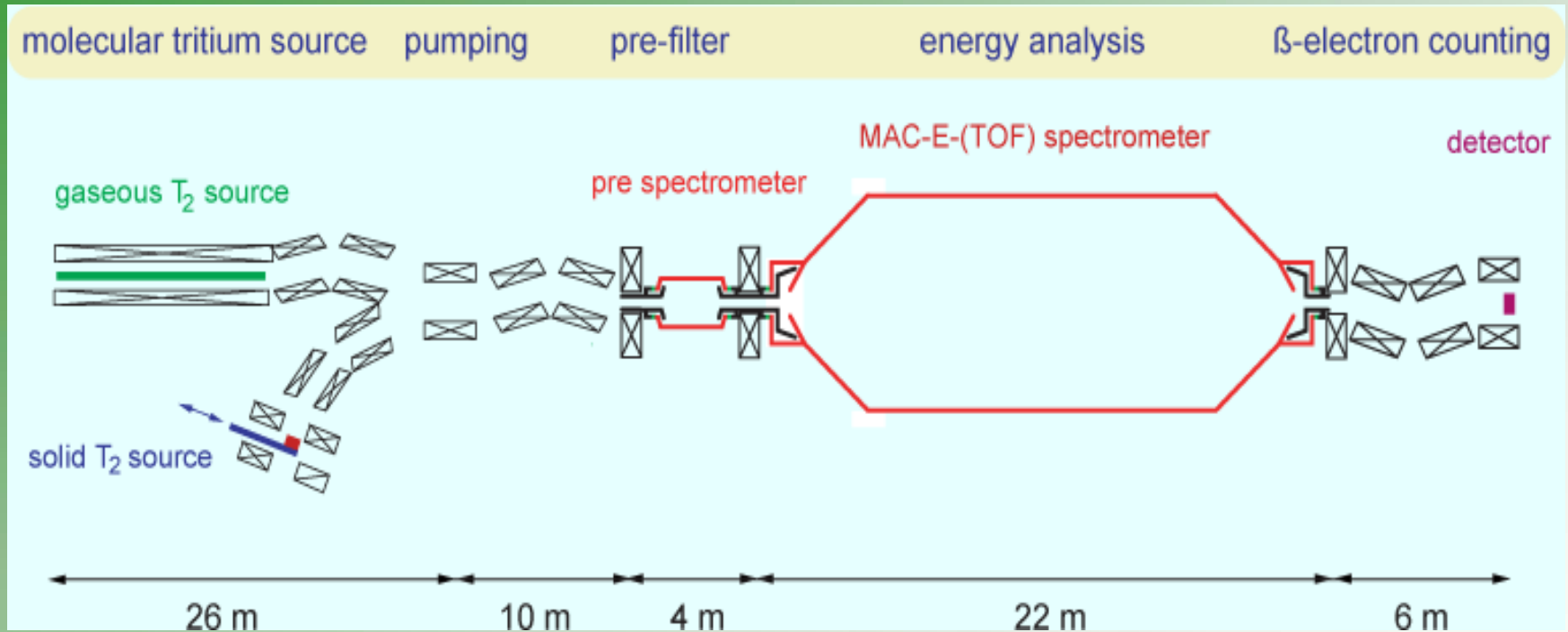
- Historical
 - SRS-1
 - Upgrades and Beam Lines
 - Diamond
- Current
 - ERL-P
- Future
 - 4 GLS

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Current Collaborations

- Linear Collider (Oleg Malyshev)
 - NEG coating
- GSI (Oleg Malyshev)
 - Electron cloud/ISD
- Katrin (RJR + Oleg Malyshev)
 - Tritium Flow
 - Spectrometer Vessel Specification

Katrin



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Vacuum Calculations

- Pressure Distributions in Molecular Flow Region
 - Monte Carlo
 - Method of Angular Distributions
 - Including sorbing/desorbing surfaces
- Not restricted to molecular flow
 - Continuum flow
 - Low Knudsen number flow (CFD/CSE)
 - Transition flow (Sharipov/Edwards BOC/NPL)

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- NEG Coatings
 - Collaboration with Manchester Metropolitan University
 - Influence of deposition conditions and micromorphology on vacuum properties

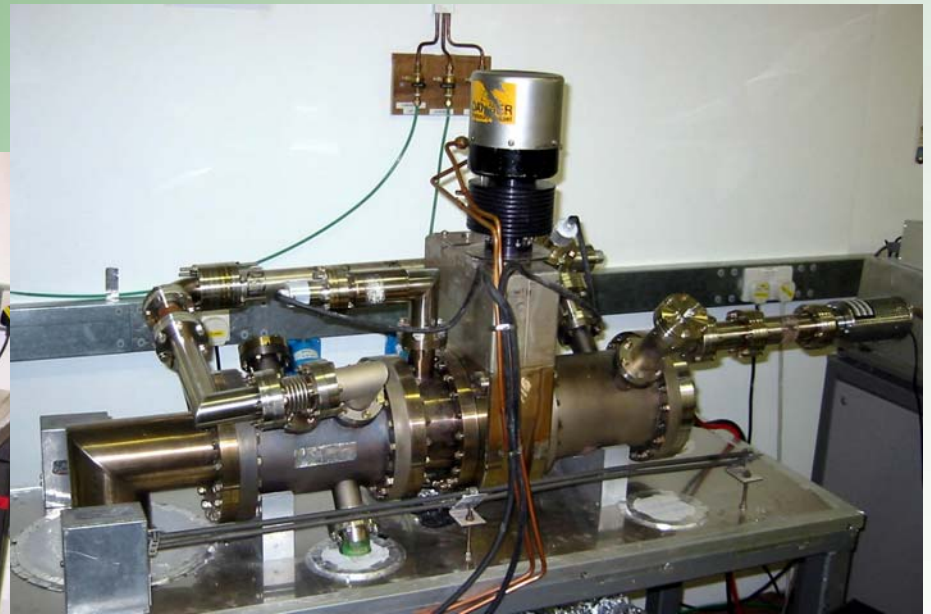
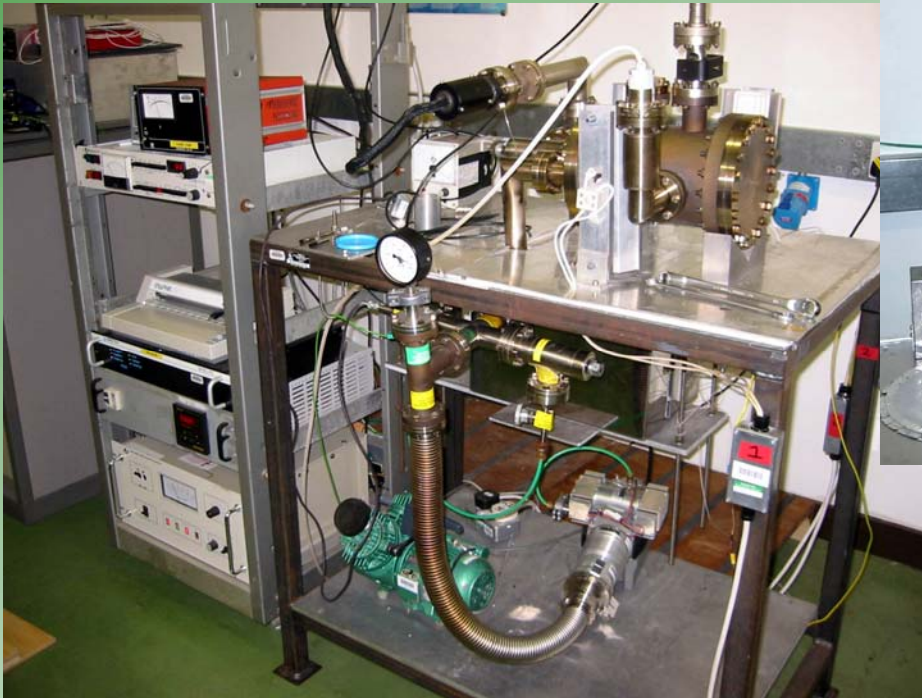


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- NEG Coatings
 - Invented by CERN
 - Traditionally magnetron sputtering
 - Central trifilar wire
- Linear Collider
 - 4mm dia tube
 - CVD/PVD
 - Can it be done?

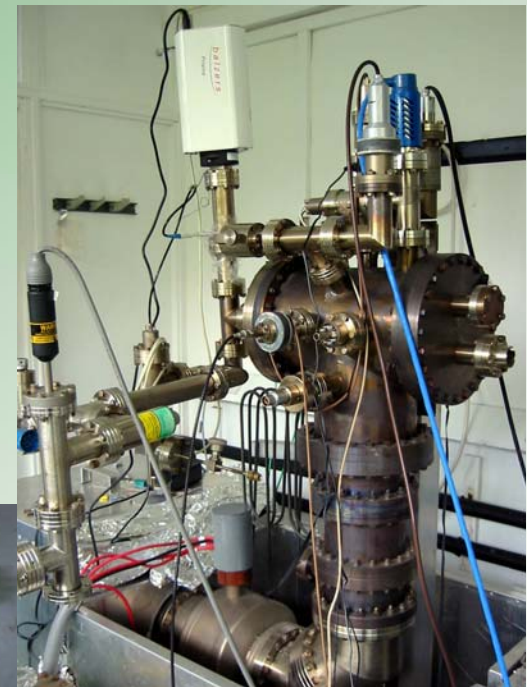
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- Outgassing and Desorption



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- Metrology



Expertise

- Wide experience in vacuum system design for accelerators (and other large systems)
- Ability to calculate pressure profiles across flow regimes
- Excellent knowledge of preparing and characterising low outgassing surfaces
- Expertise in the measurement of characteristics of gettering and sorbing surfaces
- Good experience of measuring very low total and partial pressures

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- Future Directions : some speculative!
 - Develop NEG coatings
 - Develop greater expertise in XHV technique
 - Investigate influence of surface preparation techniques on field emission and associated outgassing
 - Develop expertise in transition flow calculation techniques
 - Develop teaching modules in vacuum science