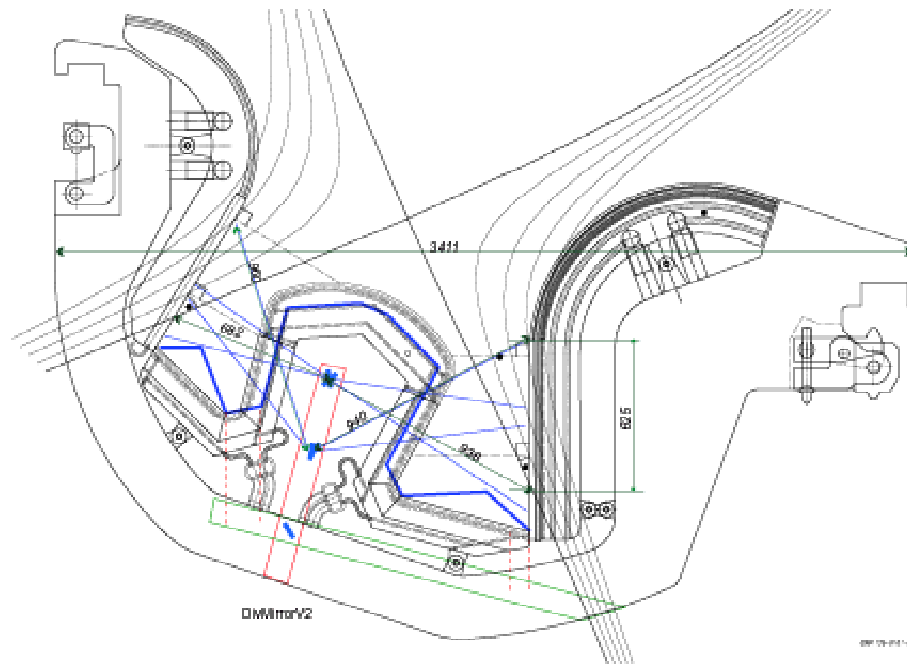


## Deposition on diagnostic mirrors

- Divertor spectroscopy needed for attachment/detachment control.
- 10-20 nm deposition will seriously affect mirror reflectivity.
- Mirrors are less than 1m away from divertor target plate that will experience cm-scale erosion.
- Lasers or other concepts could be applied to mirror cleaning - but funding/ resources are needed !



480 Rev. Sci. Instrum., Vol. 72, No. 1, January 2001

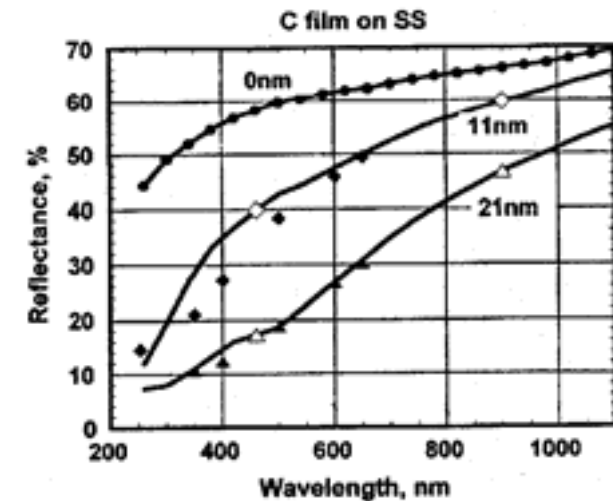


FIG. 6. Experimentally measured (solid points) and calculated (lines with corresponding open markers) spectral dependencies of effective reflectance for clean SS and for SS with carbon coating of thickness shown on each curve.

Voitsenya et al., Rev.Sci. Instrum.

This is another critical but 'orphan topic  
- not traditionally part of the  
Divertor / SOL area,  
- not part of traditional plasma diagnostics.  
Who has resources, time to tackle it ?

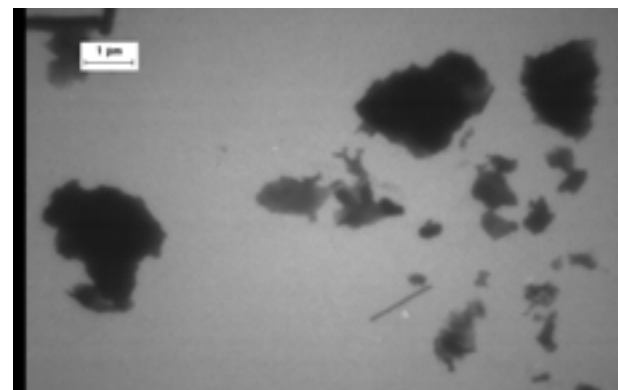
C. H. Skinner

# Dust diagnostics in ITER ?

- Dust mobility important for:
  - assessing tokamak accident scenarios,
  - occupational safety when handling tritiated components.
- Dust inventory in existing machines is difficult to measure. It was impossible to measure in TFTR after DT.
- However operation of ITER depends on demonstrating compliance with strict inventory limits
- What basis exists for assuring limits are satisfied ?
- Advances in dust detection and removal are urgently needed.  
[Rev. Sci. Instrum. v. 75 (Feb. 2004)]
- Orphan area
  - not part of traditional plasma diagnostics,
  - not part of tokamak engineering
  - not part of Divertor / SOL group
- Who owns this issue ?

Dust	Safety Issue	Limits (kg)
Beryllium	Reactivity with steam and H <sub>2</sub> Toxic	10-20 on hot surfaces
Carbon	Tritium retention Explosion with air	~100
Tungsten	Activation	100-400

*TEM photomicrographs of TFTR dust*



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## *Tritiated dust levitation by beta induced static charge*

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- Ambipolar effects charge up tokamak dust and could lead to core contamination [Krasheninnikov et al., Kyoto 2003]

### FOR TRITIATED DUST:

- Radioactive decay of tritium via beta emission leaves a positive charge on a dust particle.
- Tritiated particles could be uniquely more mobile than other dust.

