



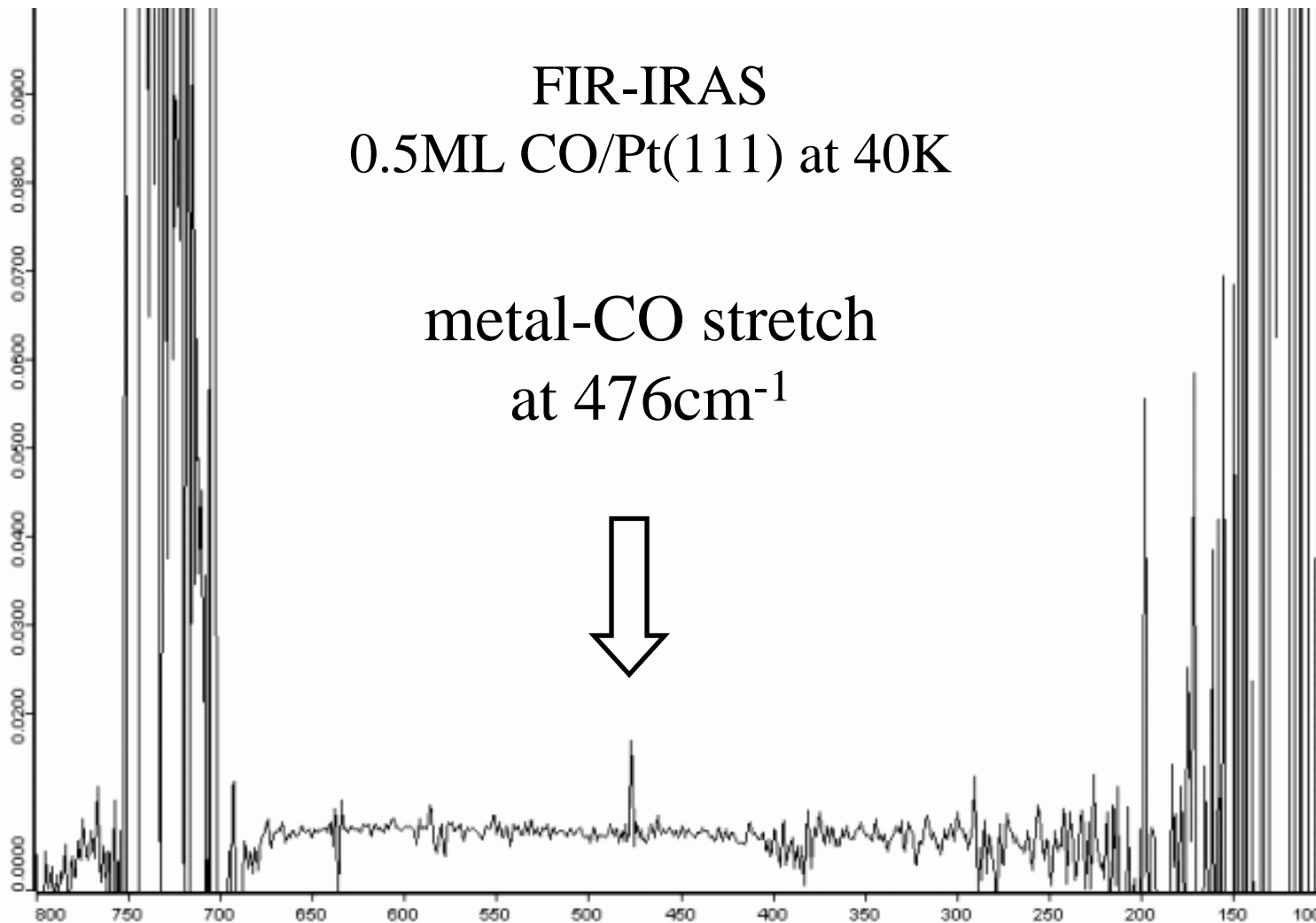
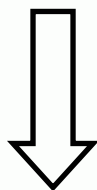
# SPring-8でのIRASの現状

## スタートラインにつきました

JASRI/SPring-8 森脇太郎

FIR-IRAS  
0.5ML CO/Pt(111) at 40K

metal-CO stretch  
at  $476\text{cm}^{-1}$



# Experimental

SR-Diamond(0.75mm)-  
Mylar3.5-Diamond(0.25mm)-  
CO/Pt(111)-Diamond(0.25mm)-  
SiBolometer

368scans at 2cm<sup>-1</sup> resoln.

0.5ML CO on Pt(111) at 40K

# Things that prevent us from getting started

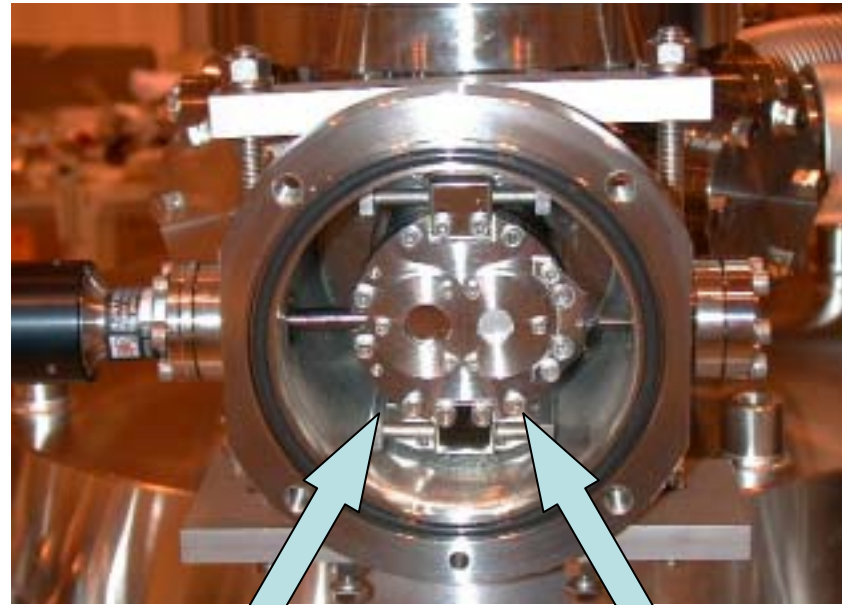
- リング取り出しM0ミラーの歪み
- (結果的に)入射窓の有効径
- (検出器ノイズ、感度の個体差)
- (上流光学系のゆれ)

# Distorted M0 reflection



Insufficient cooling and  
Heat deformation of M0

# Windows

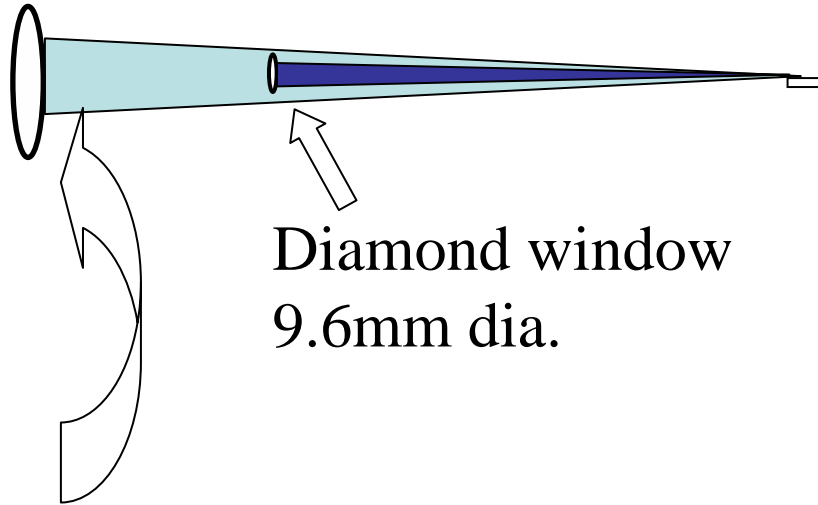


13mm Silicon  
( $t=3\text{mm}$ )

9.6mm Diamond  
( $t=0.25\text{mm}$ )

# Before Autumn2002

Mirror  
50mm dia.  
L=300mm



Sample to mirror  
=300mm  
Sample to window  
=233mm

Diamond window  
9.6mm dia.

Size of light

Supposed to be 10mm or smaller

- Approx. 25mm
- Approx. 19mm at the diamond window
- Discard approx.50% of the light (vertically)

# Present

ISSS optics (Dec01-Jan02)

M0 (Jul02)

Sample to mirror  
=1400mm

Sample to window  
=233mm

Mirror 85mm dia.

L=1400mm



Diamond window  
9.6mm dia.



Approx. 25mm even w/o “size reducing optics”

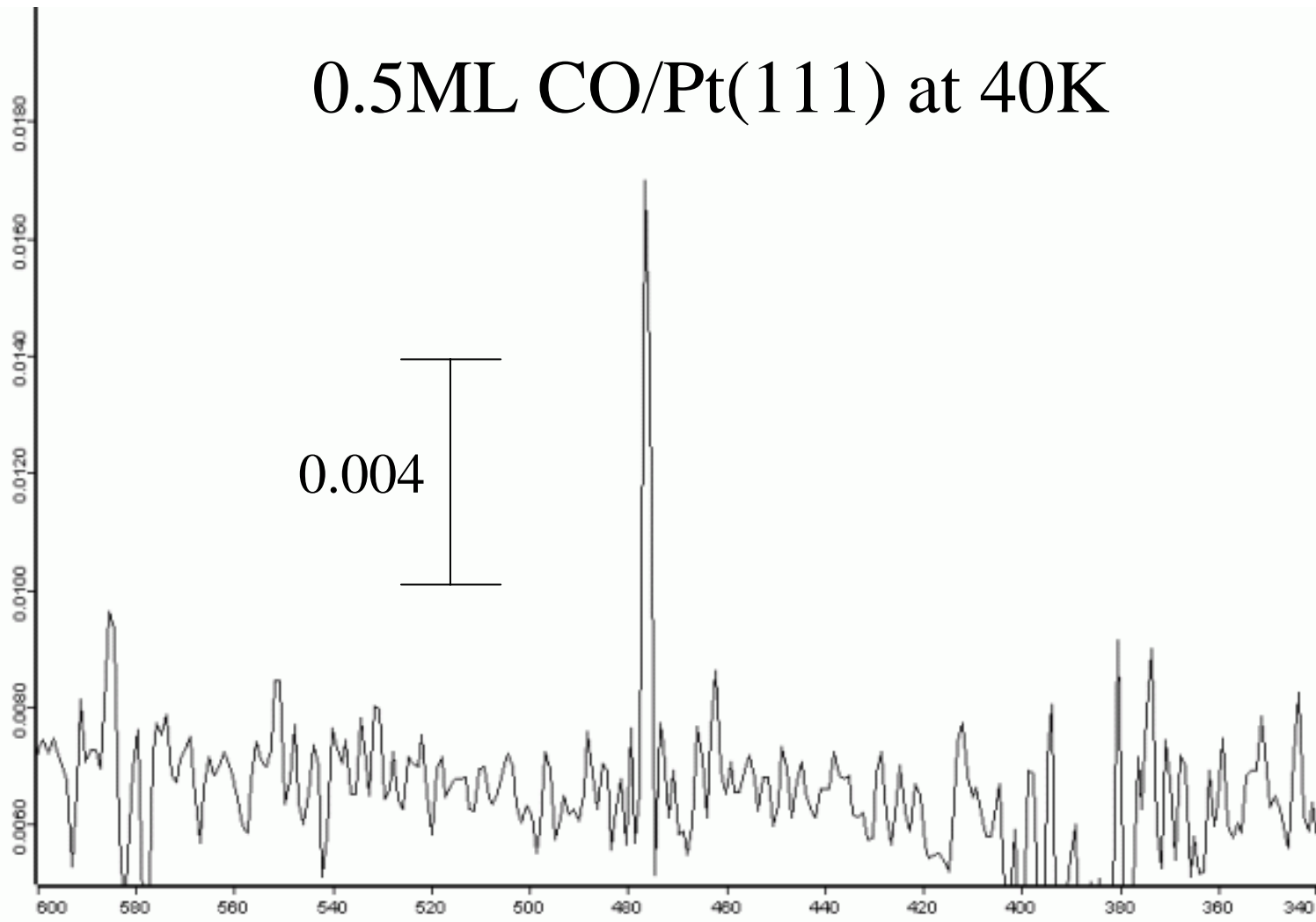
- close to the original plan
- approx. 4mm at the diamond window
- over 3times more intense (MIR)



# Replacement of M0 and optics at ISSS (Infrared surface science station)

- 窓での損失見込み以上に強度が増加
- ビームサイズ減少によるサンプル端損失の軽減
- 遠赤外領域では(SP8)SRはGlobarに比べて強度が高いわけではない(FTIR内部検出器で比較)
- ISSSにおいても実は高輝度がメリット

# 0.5ML CO/Pt(111) at 40K



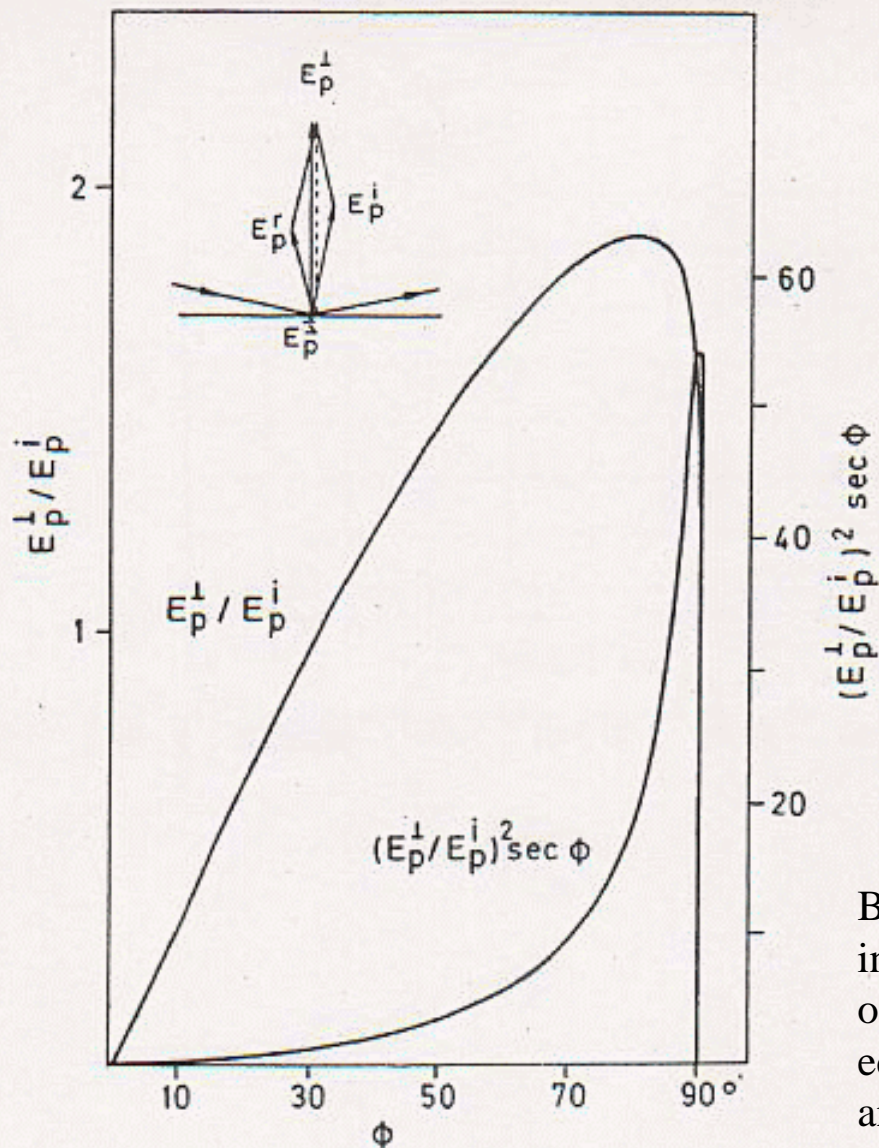
# How to breed these spectra

Reproducibility Intensity S/N

- 入射角の再現性  
入射ミラー、入射窓、サンプル位置
- 偏光子の導入
- (検出器)
- (上流光学系のゆれ)



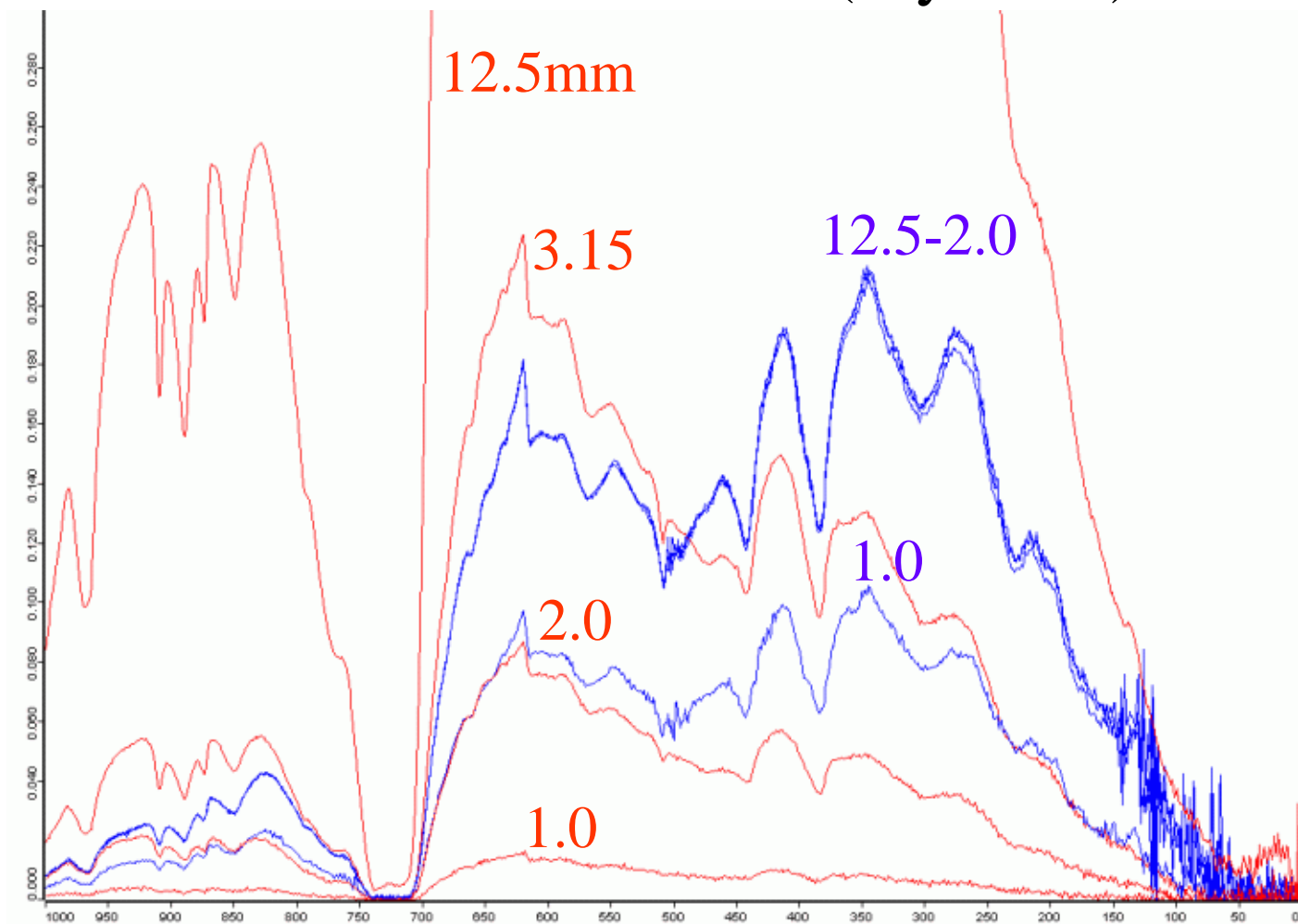
# Incident angle and IRAS



B.E.Hayden  
in "Vibrational Spectroscopy  
of Molecules on Surfaces"  
edited by J.T.Yates,Jr.  
and T.E.Madey

Figure 3. The relative amplitude  $(E_p^\perp / E_p^i)$  of the electric field perpendicular to the surface as a function of incident angle  $\phi$ , together with the quantity  $(E_p^\perp / E_p^i)^2 \sec \phi$ . The inset shows the dominance of the normal component of the field of the surface arising from the  $p$  component. (After Ref. 24.)

# SR vs Globar (Mylar3.5)



# SR vs Globar (Mylar6)

