

***V*SANS**  
***Instrument***  
***Overview***

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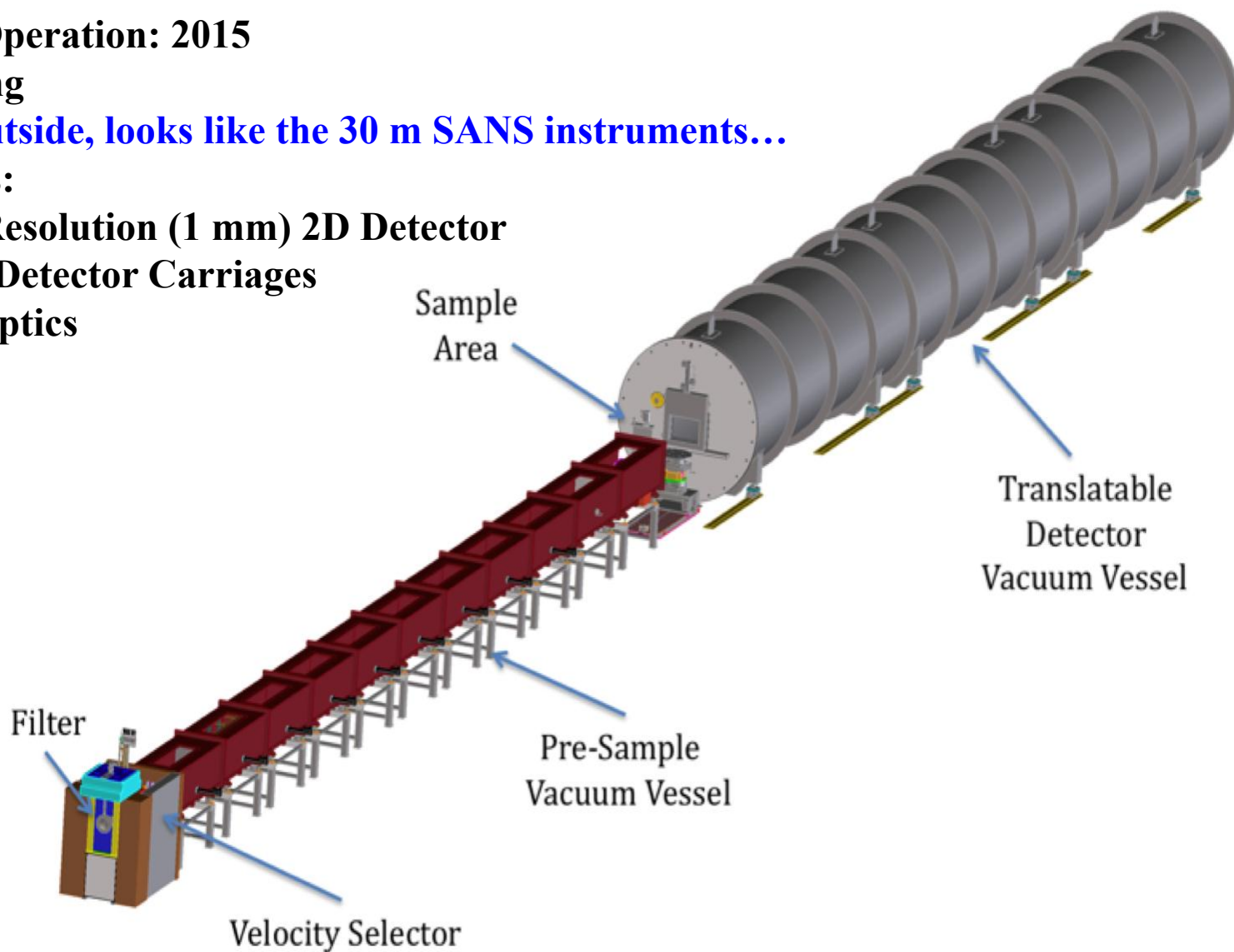
**Initial Operation: 2015**

**45 m long**

**From outside, looks like the 30 m SANS instruments...**

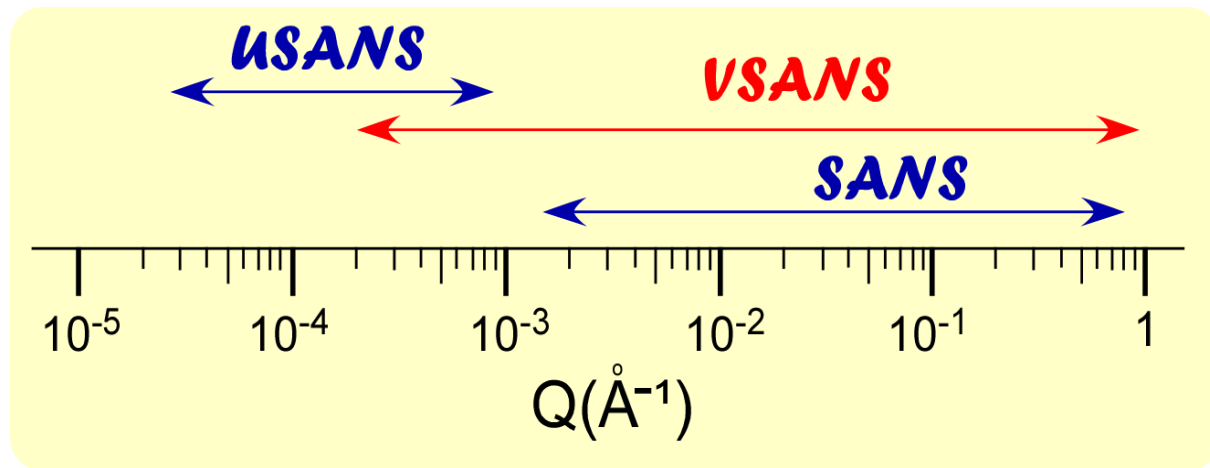
**Includes:**

- **High Resolution (1 mm) 2D Detector**
- **Three Detector Carriages**
- **New Optics**



## Instrument Characteristics (Blue → New or improved feature)

Source	Ni <sup>58</sup> Guide 60 mm wide x 150 mm tall
Wavelength Range	4 to 20 Å
Wavelength resolution	2% (graphite), 12.5 % (Selector) and White Beam
Source-to-sample distance	4 m to 22 m in 2 m steps
Sample-to-detector distance	0.6 m to 22.5 m continuous
Collimation	<ul style="list-style-type: none"><li>• Circular pinhole – several sizes up to 60 mm diameter</li><li>• Rectangular XY slits – continuous range 0-60 mm x 60-150 mm</li><li>• Multiple (18) Converging circular beams + lens + prism</li><li>• Multiple (3) converging narrow rectangular beams + lens</li></ul>
Sample Size	<ul style="list-style-type: none"><li>• Circular: 1 mm to 30 mm diameter</li><li>• Rectangular width 1 to 18 mm, height 12 to 75 mm</li><li>• Converging beams: typically 35 mm x 72 mm</li></ul>
Q-range	$2 \times 10^{-4} \text{ Å}^{-1}$ to $1.0 \text{ Å}^{-1}$
Detectors	<ol style="list-style-type: none"><li>1) 1 mm fwhm res., 2D, 320 mm x 320 mm</li></ol>
separate carriages	<ol style="list-style-type: none"><li>2) 8 mm fwhm res. 2D (tubes), four panels: 384 mm x 1000 mm</li><li>3) 8 mm fwhm res. 2D (tubes), four panels: 384 mm x 500 mm</li></ol>

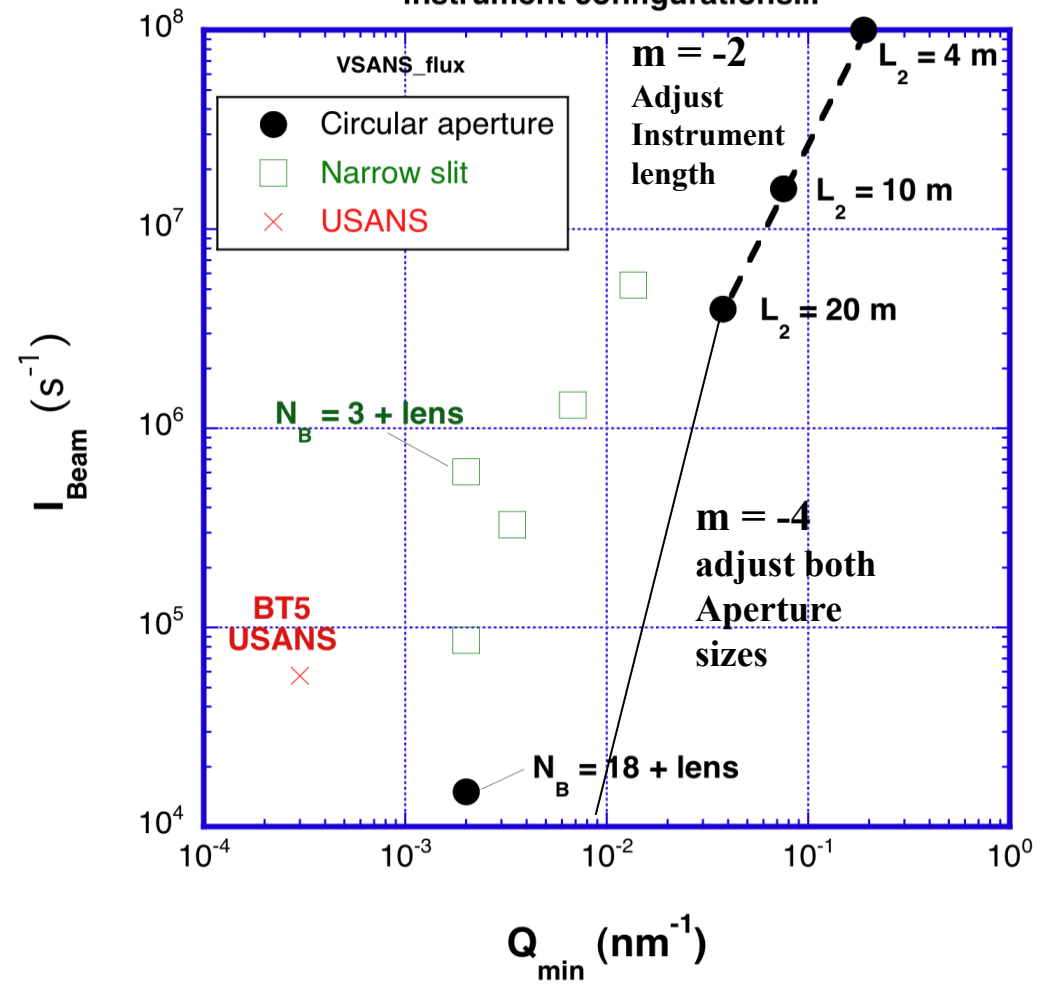


Front & Middle Carriages: 8 mm res.	Four Detector Panels Each:
Left & Right Panels	384 mm wide x 1000 mm Tall
Top & Bottom Panels	500 mm wide x 384 mm Tall
Back Carriage: 1 mm res.	~ 320 mm x 320 mm

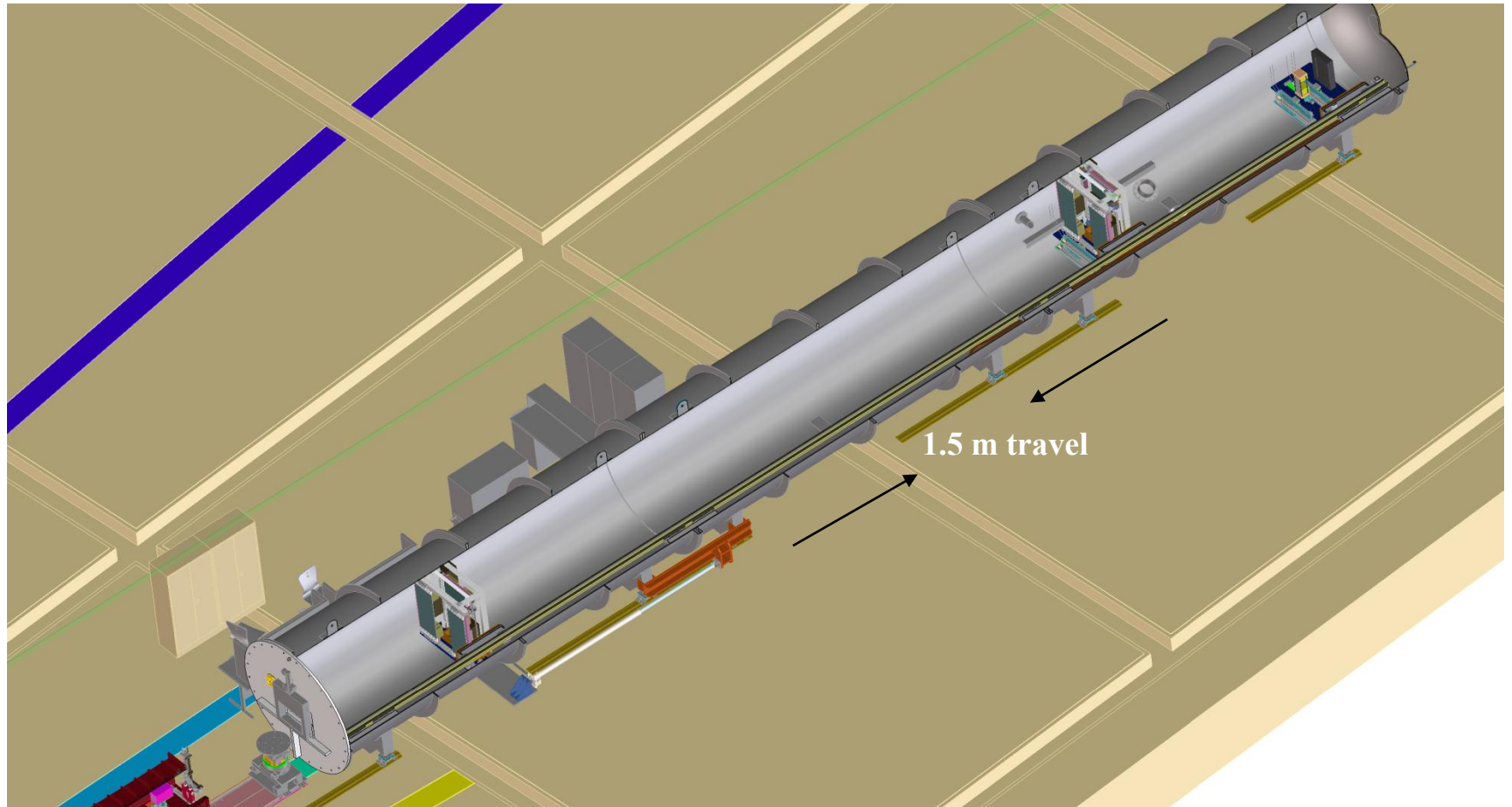
	Front	Middle	Back
Resolution (fwhm)	1 mm	8 mm	8 mm
Sample-to-Detector Distance	1.5 m	10 m	22.5 m
Panel Spacing	~	160 mm	180 mm

Collimation type	Narrow Slit	Converging Beams	Large Pinhole
Source Aperture	5 mm x 150 mm	6 mm dia,	60 mm dia.
Sample aperture	2.5 mm x 75 mm	35 mm x 72 mm	30 mm dia.
		{10 mm dia. Each}	
Beam stop	10 mm x 300 mm	10 mm dia.	120 mm dia.
Sample-to-detector	22.5 m	22.5 m	22.5 m
Wavelength	6 Å	7.5 Å	6 Å
$Q_{\min}$	$2.3e-4 \text{ Å}^{-1}$	$1.9e-4 \text{ Å}^{-1}$	$2.8e-3 \text{ Å}^{-1}$
$Q_{\max}$	$0.45 \text{ Å}^{-1}$	$0.36 \text{ Å}^{-1}$	$0.45 \text{ Å}^{-1}$
Beam Current	$9.7e4 \text{ s}^{-1}$	$9.0e3 \text{ s}^{-1}$	$1.4e6 \text{ s}^{-1}$

Beam current on sample for various instrument configurations...

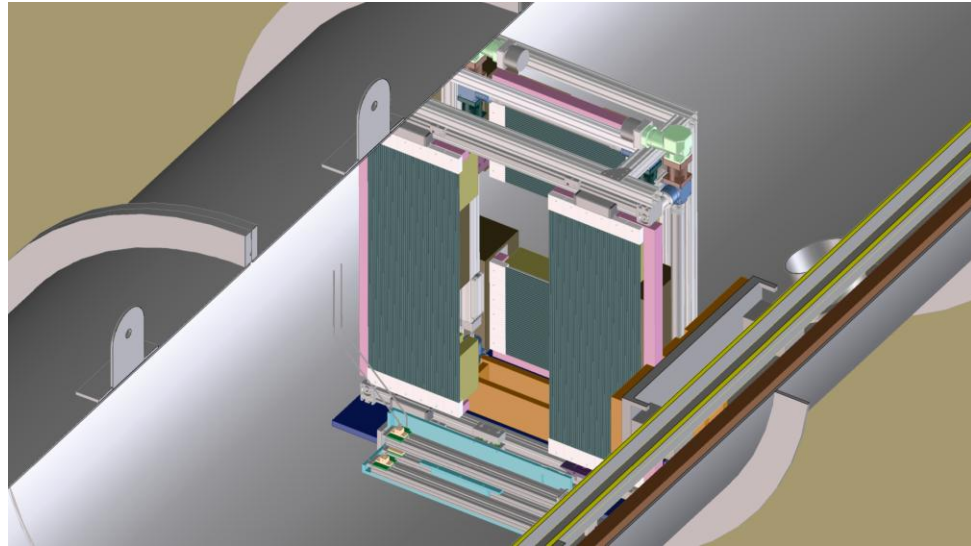


Cutaway view of detector vessel showing three movable detector carriages

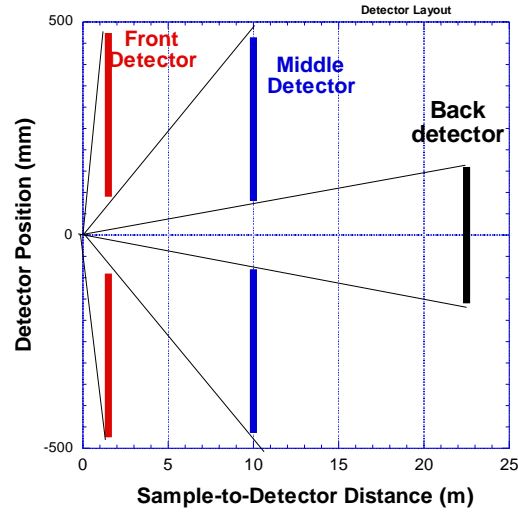


**Movable 2D Detector Panels  
to form a Picture Frame:**

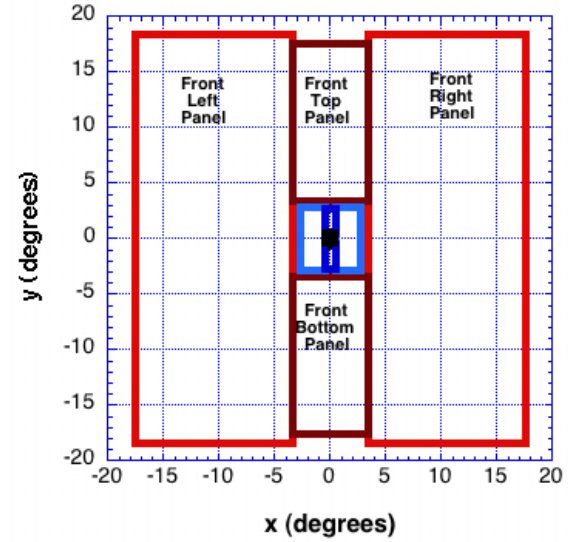
- Side Panels 384 mm x 1000 mm
  - Top/bottom 500 mm x 384 mm
- Extends Q-range by factor of 30x**



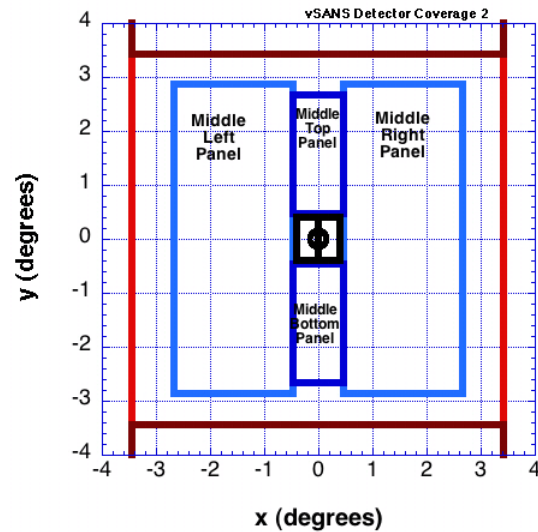
## Side View



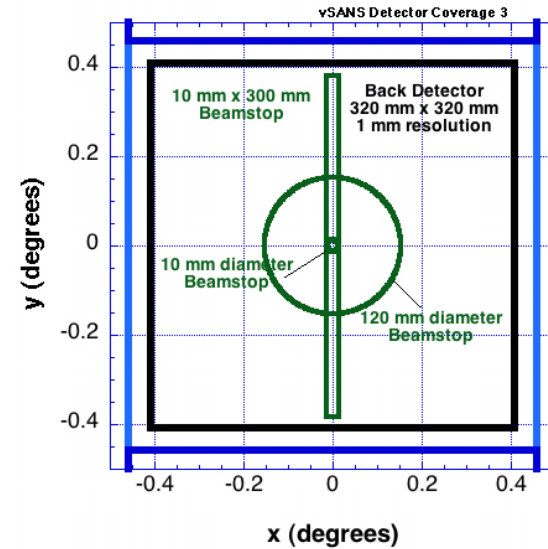
## Front View



## Front View at 5x



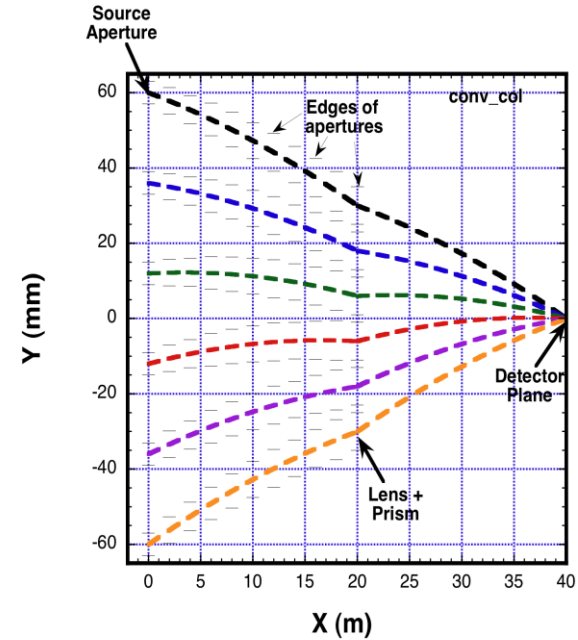
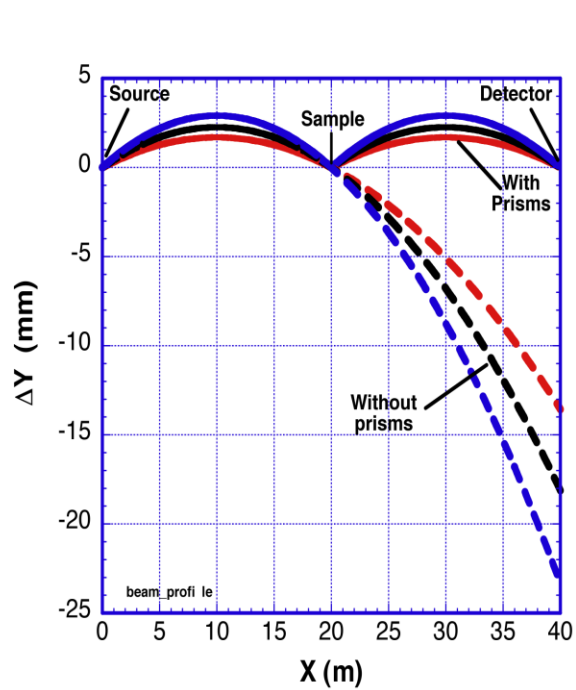
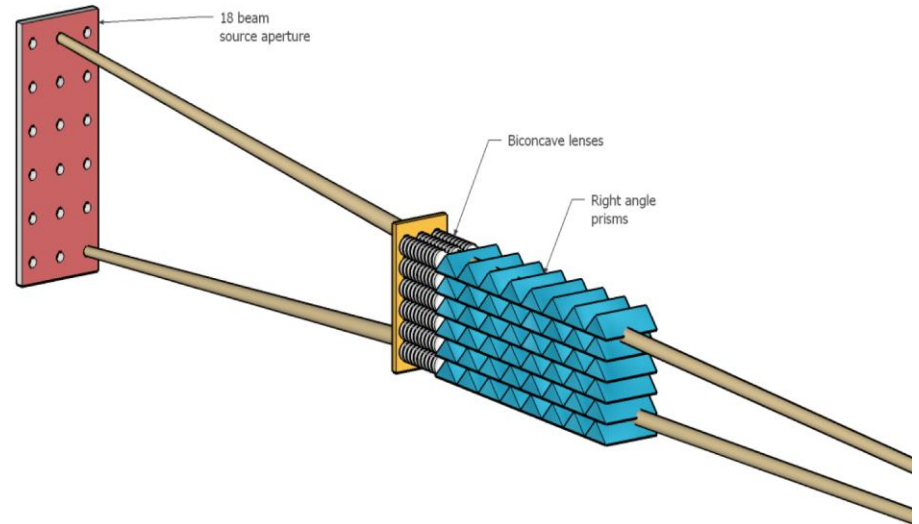
## Front View at 50x





## 18 Converging Beams:

- Prisms to counter gravity
- Lenses for focusing
- Intermediate masks to stop crosstalk



## Presample Vessel:

- XY slits
- 18 hole Converging Masks
- 3 slit Converging Masks
- Lenses & Prisms
- Polarizing Cavity
- Graphite Monochromator (2%)

