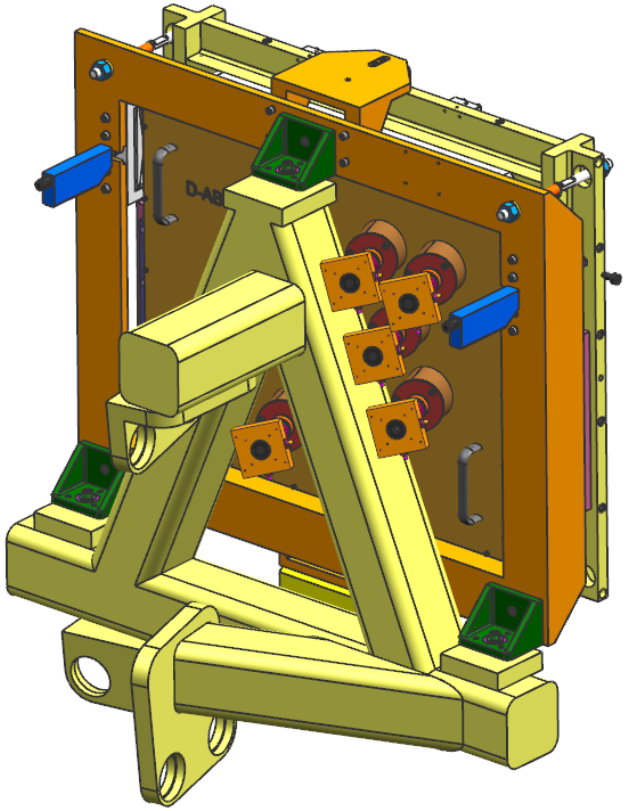
Sub-Aperature Backscatter Station (SABS) for OMEGA EP



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Diagnostic Workshop
University of Rochester
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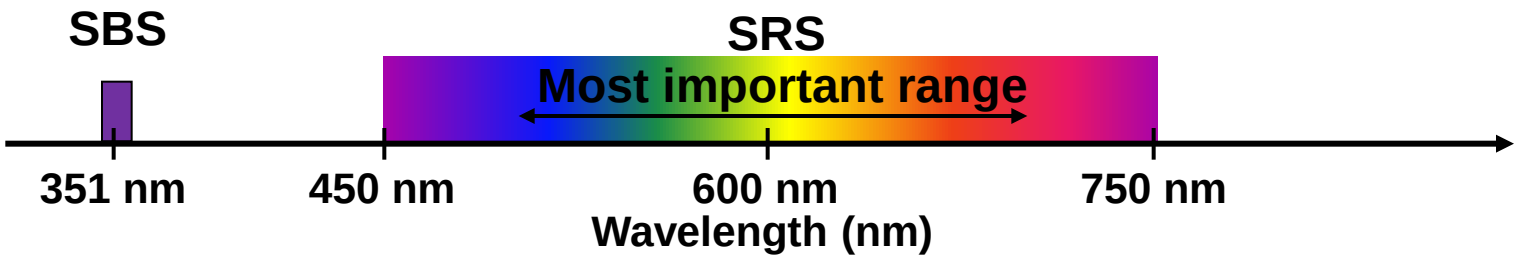
Backscatted light reflects into two spectral bands: stimulated Brillouin scattering (SBS) and stimulated Raman scattering (SRS)



- Experiments on EP would like to measure the energy that is backscattered by the UV beams from the target (i.e., not coupled)
- MagLIF experiments are the current primary experimental driver for this diagnostic

The EP FABS is perusing a two phased approach due to limitations in access to the backscattered light

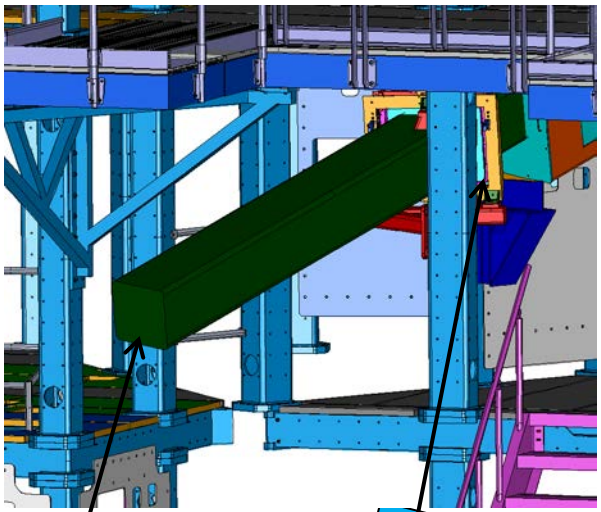
Phase I (Proof of concept experiments)

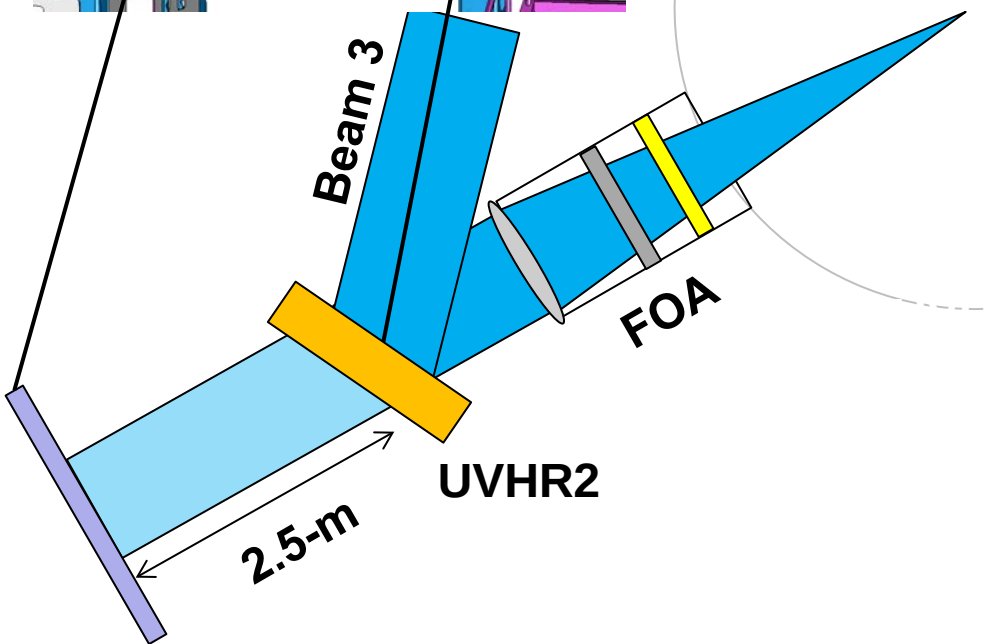
- **Measure the SBS reflectivity (E_{SBS}/E_{in}) to within 25%**
- **Measure the SRS reflectivity (E_{SRS}/E_{in}) to within 25%**
- **Measure 1%-60% of the incident laser energy at 1 kJ.**

Phase II (Refined total measurement)

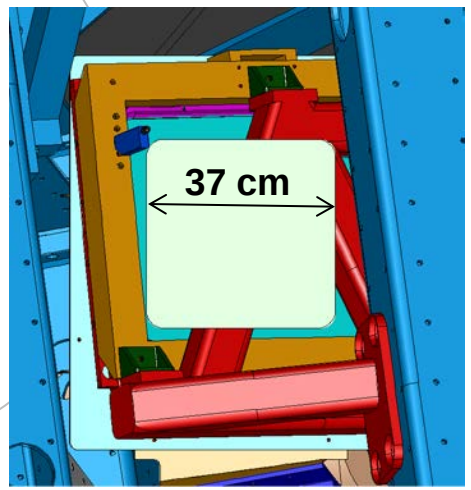
- **Measure the SRS time resolved spectrum**
  - **Temporal resolution 100 ps**
  - **Spectral resolution 5 nm (SRS), 0.05 nm (SBS)**

The mirror structure prevents significant light from propagating behind the turning mirror

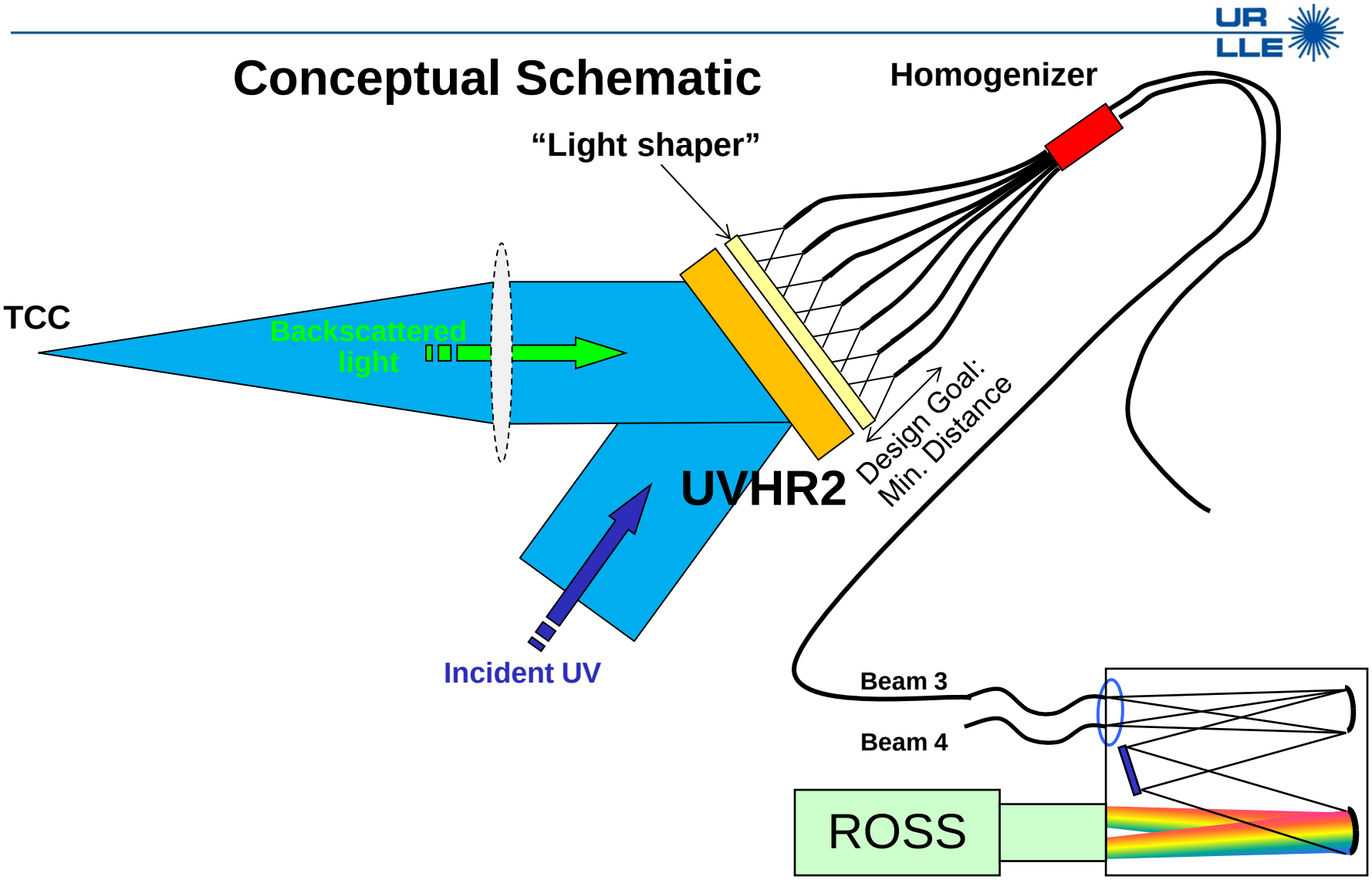




View to TCC from scatter plate (Beam 3)

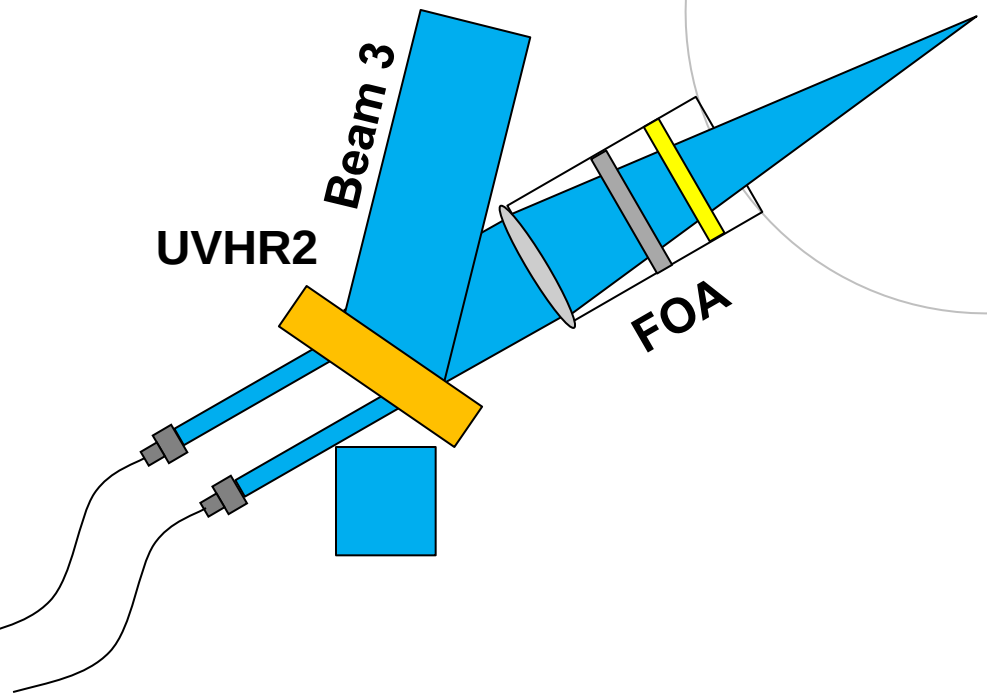


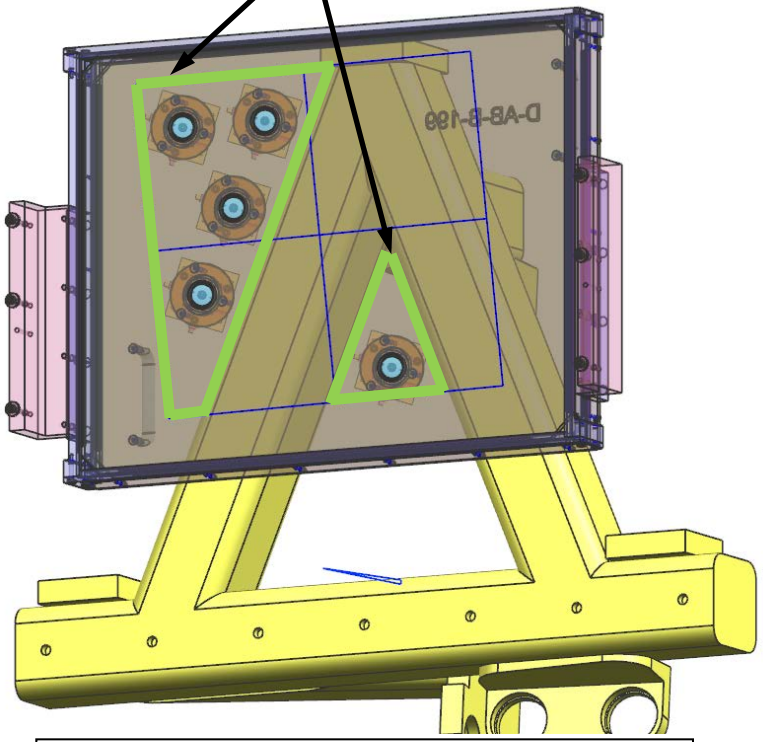
The new concept uses many fibers to sample the light directly behind the UVHR2



Phase I

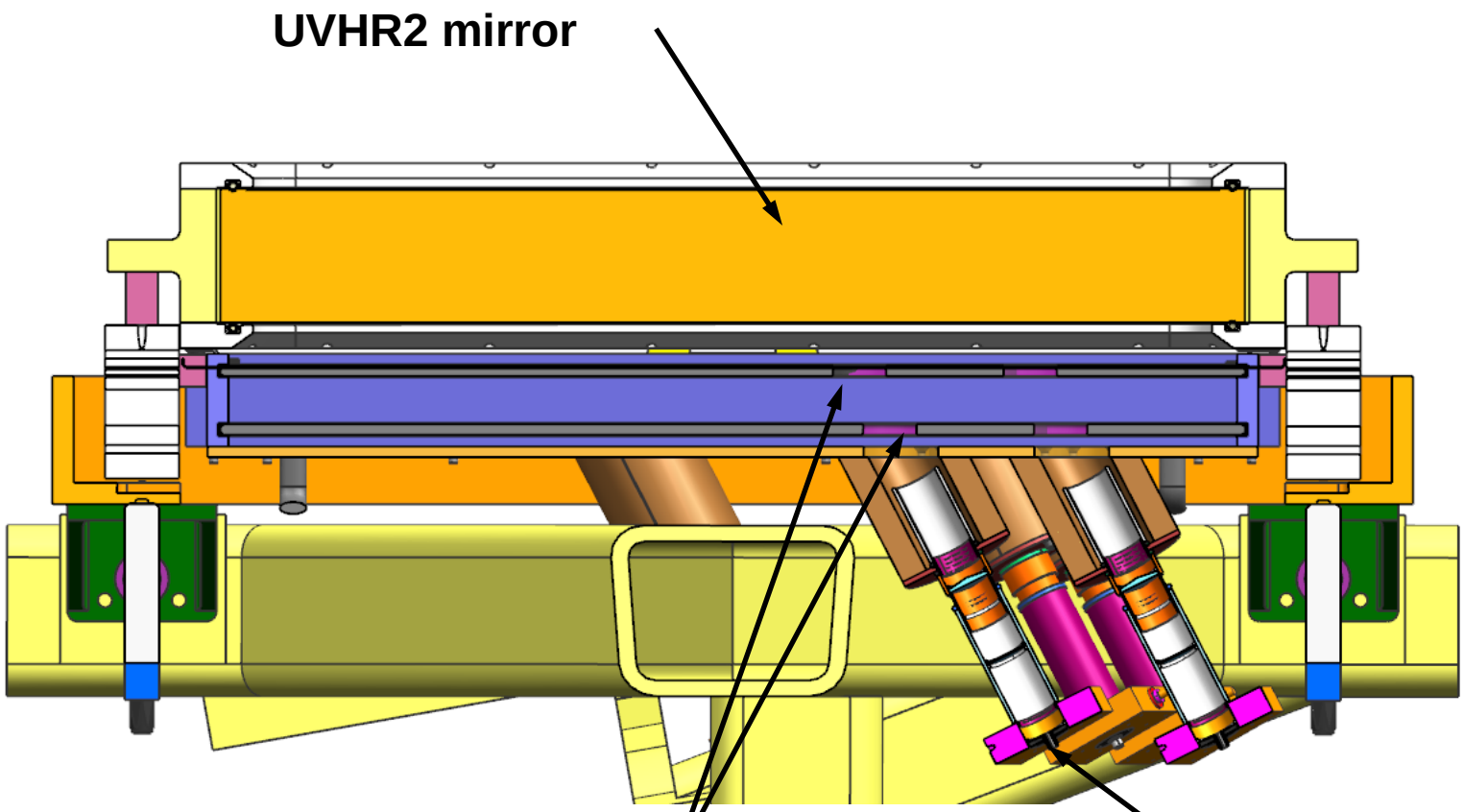
Build a series of detectors (~5, 2-4 cm diam.) to sample the available area and measure spatial variation to define number of sample points required





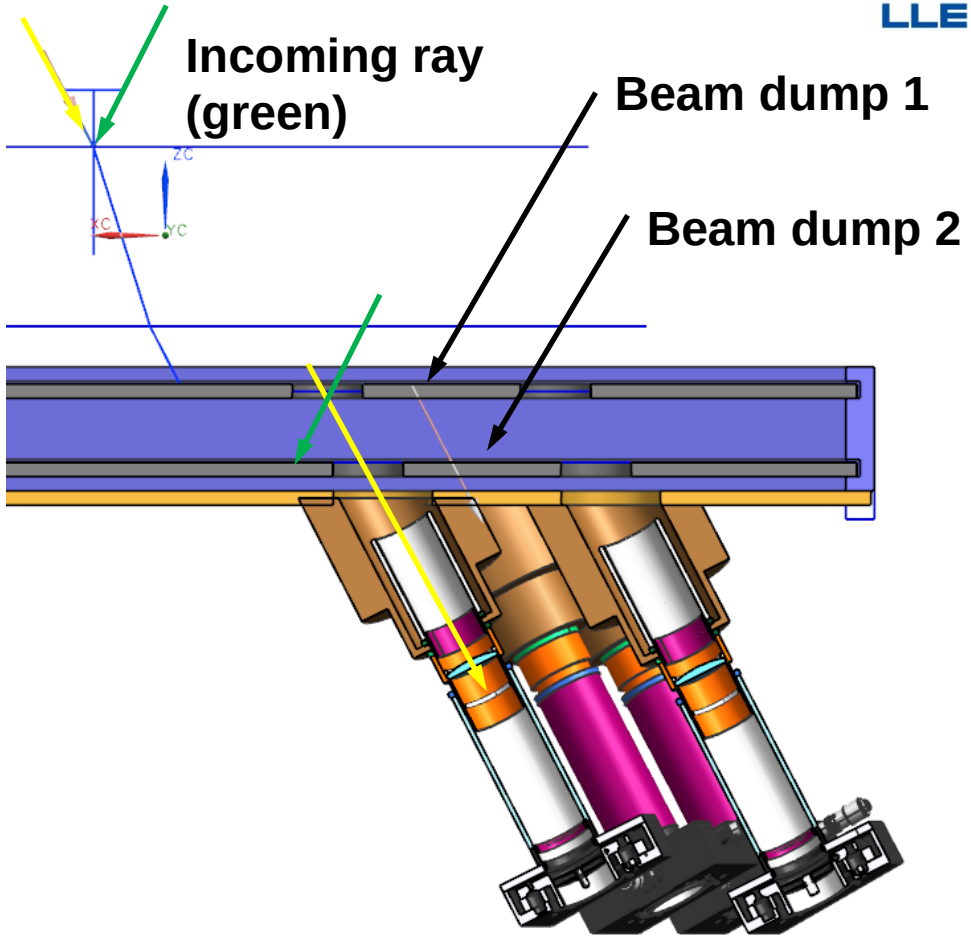
EP-SABS viewed normal to the back reflected beam

An array of light collectors behind the UVHR2 BL4 mirror collect backscatter light for measurement in Diagnostic Bay 3

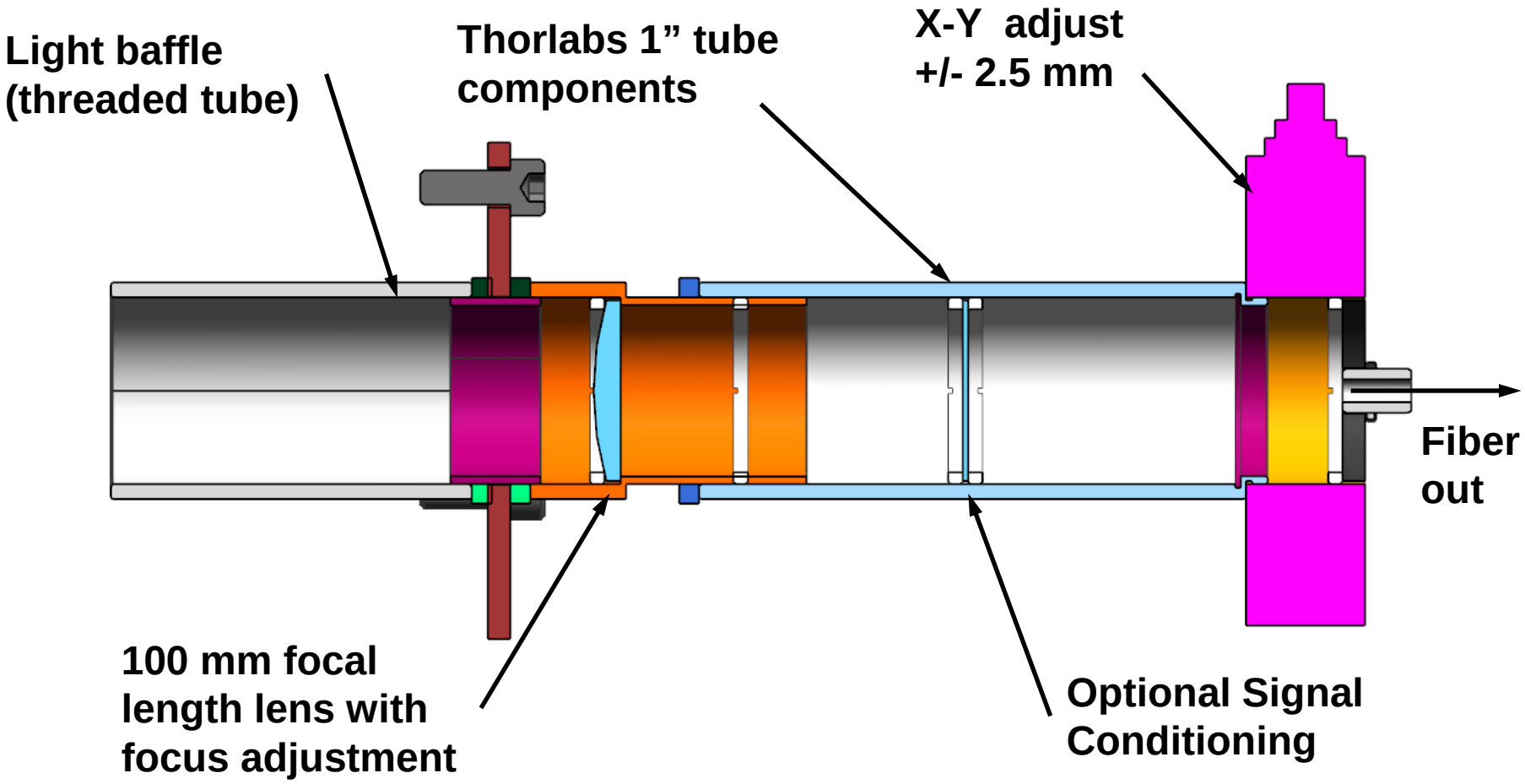


Two beam dumps block the primary rays while passing the backscattered rays to the collector array

Back reflected ray (yellow)



Each collector focuses the backscattered light onto a fiber



A phased approached for EP FABS will demonstrate the concept and define the required sample points to meet the physics requirements

- **A fiber based system has been designed to measure backscattered light on OMEGA EP**
- **Phase I will demonstrate the concept on Beam 4**
- **Phase II will implement streak spectrometery to measure the power scattered into SBS and SRS**
  - **Absolutely power calibrated streak cameras to limit the number of active measurements**

First experiments will use EP SABS in July