

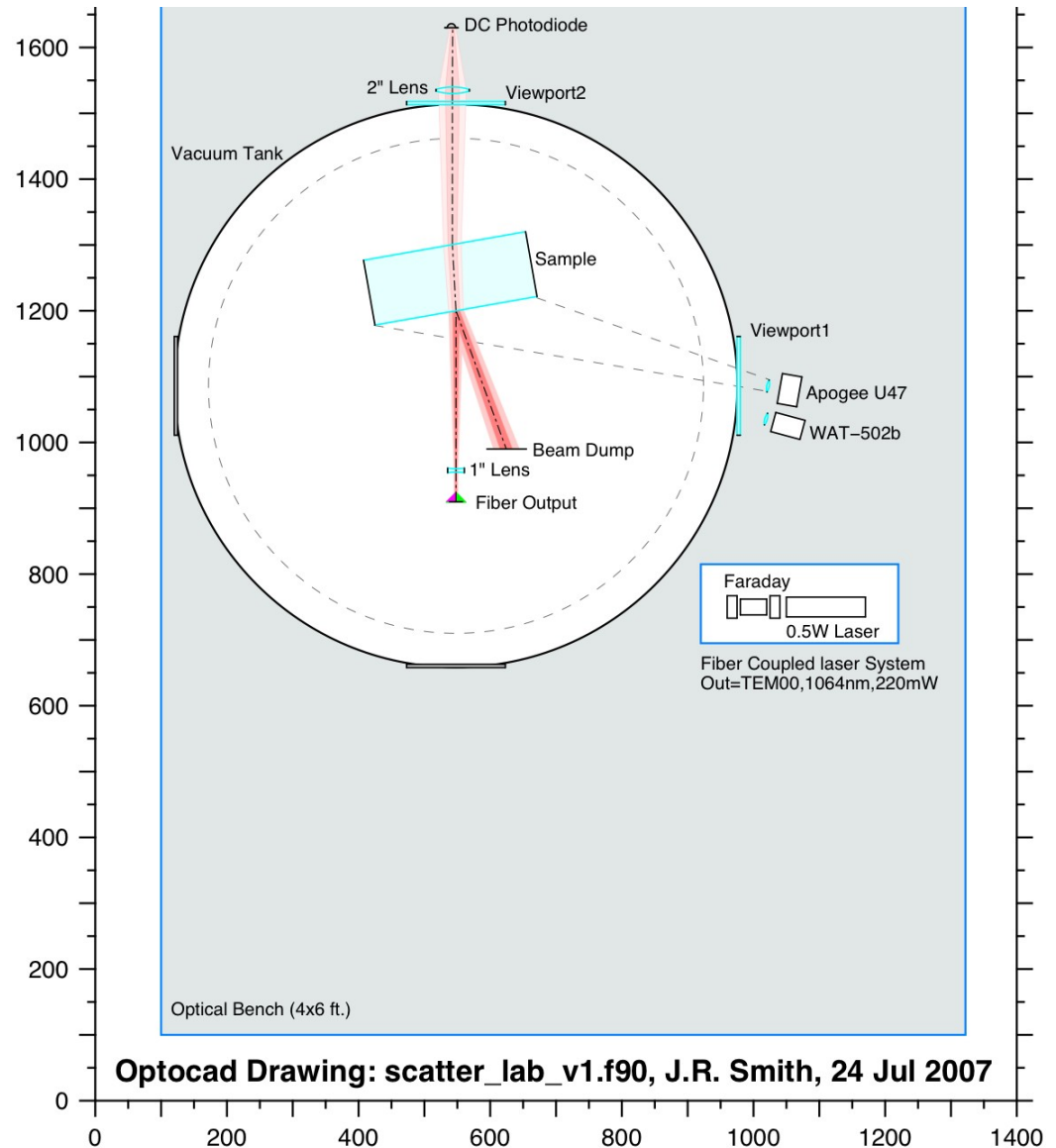
Scatter Imaging Lab: Design and Progress

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- Initial LIGO mirrors have scatter loss > 60 ppm
- Advanced Ligo mirrors will not be radically different (higher quality silica substrates, silica-tantala coatings) but we want less scatter
- From Kells T070051:
 - About 40ppm scattered to large angles per HR surface
 - This is composed of a “globular cluster” pattern + diffuse background “glow”
 - % scatter from each component not well known
 - Could be more accurately determined with better cameras and software
- Lab to allow high sensitivity, high resolution imaging of large angle scatter LIGO optics

- Sample in clean (vac.) environment
- Illuminate HR surface with ~cm beam
- Image surface with high sensitivity CCD
 - Rotation stage planned to view under any large angle
- Analysis in Matlab



- **Persons involved: Peter Saulson, Josh Smith (postdoc), Don Bunk (1 semester GradLab) + undergrads?**
- **Equipment:**
 - **Already in lab:**
 - **Optical table, vacuum tank, computers**
 - **Converged on:**
 - **Crystalaser: 0.5W, 1064nm, TEM00, lin pol, single long. mode**
 - **Fiber vac. feedthrough**
 - **Down to two:**
 - **High quality CCD:**
 - **Apogee U47: 1024x1024 pix, low noise astronomy cam, but low 1-2% QE silicon chip**
 - **Goodrich 320ktsx: 320x256 pix, low noise NIR imager, high 80% QE InGaAs chip**
- **Don's GradLab starts this Fall**