

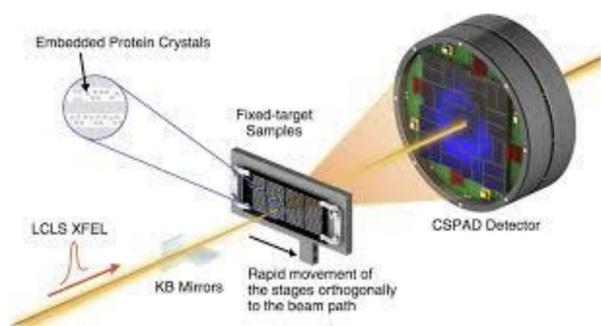
Fast fixed target sample delivery for macromolecular femtosecond crystallography

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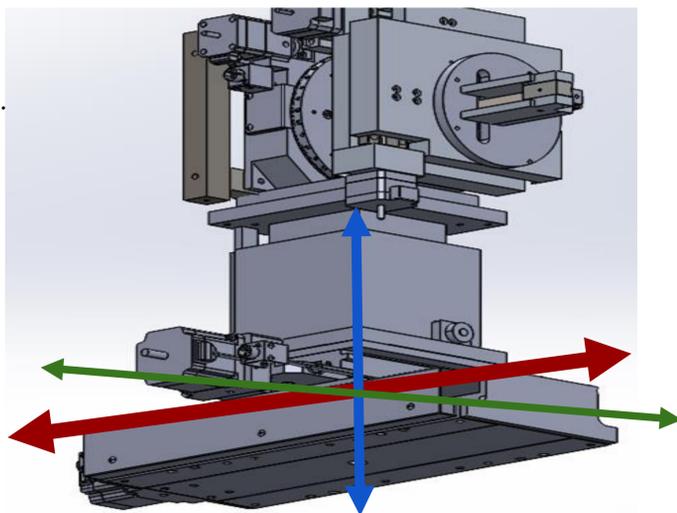
Fast Fixed Target Stage

Upgrades in sample delivery instruments for the increase in capabilities of the LCLS-II.



A fast fixed target stage is a sample delivery instrument that places the sample chip orthogonal to the laser by using linear translation stages.

The Coyote is a fast fixed target stage designed to position a sample well to match the 120 Hz pulse rate of the XFEL



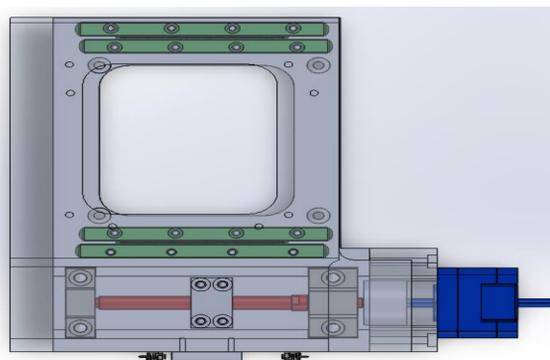
1. the **x**-direction (horizontal and orthogonal to the laser),
2. the **z**-direction (parallel to the laser),
3. the **y**-direction (vertical and orthogonal to the laser)

Design of Custom Aperture Stage

Essential Components:

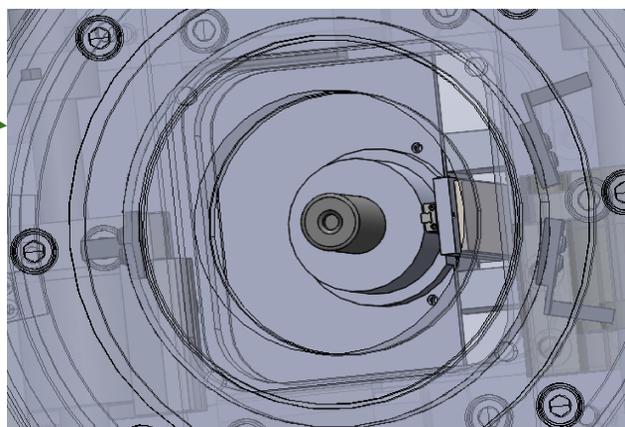
- Cross roller guides
- Bipolar 2-phase motor
- Lead Screw

90 mm x 80 mm open stage design



| Characteristic: | Value: |
|---------------------------------|--------|
| Mean Diameter (mm) | 7.25 |
| Lead (mm) | 1.5 |
| 1045-brass friction coefficient | 0.19 |
| Holding torque (Nm) | 0.48 |
| Vertical Load (kgf) | 32 |

The length needs in x are now recessed within the alignment stages.



Mounting the Dynamic X Motor and Encoder

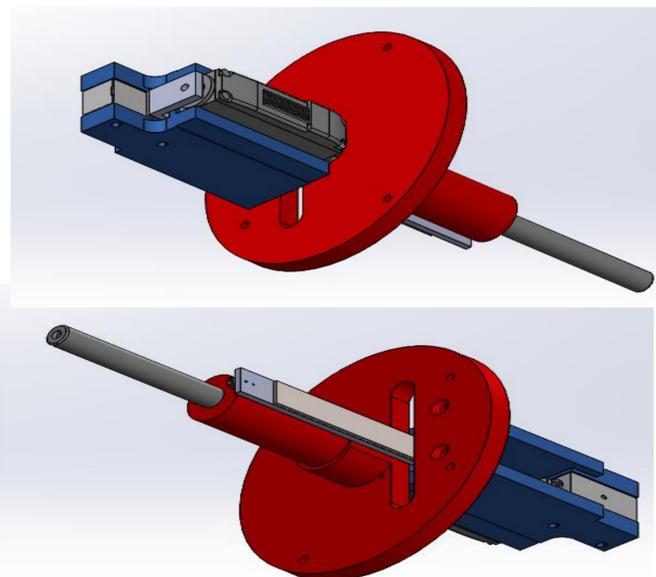
The dynamix X stage needs 160 mm of travel.

Round hub:

- mates with ape-stage face
- linear bearing
- rail guide.

Motor mount:

- mates motor with hub face
- Bracket and scale
- Encoder



Next Steps:

- Create seal for He containment with mating chamber
- Automate Chip change for continuous operation

The Full scope of The Coyote:

- The chip (see: Kenny Chan)
- The optics (see: Prakriti Subedi)

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