

AAM, Sep 29 2017

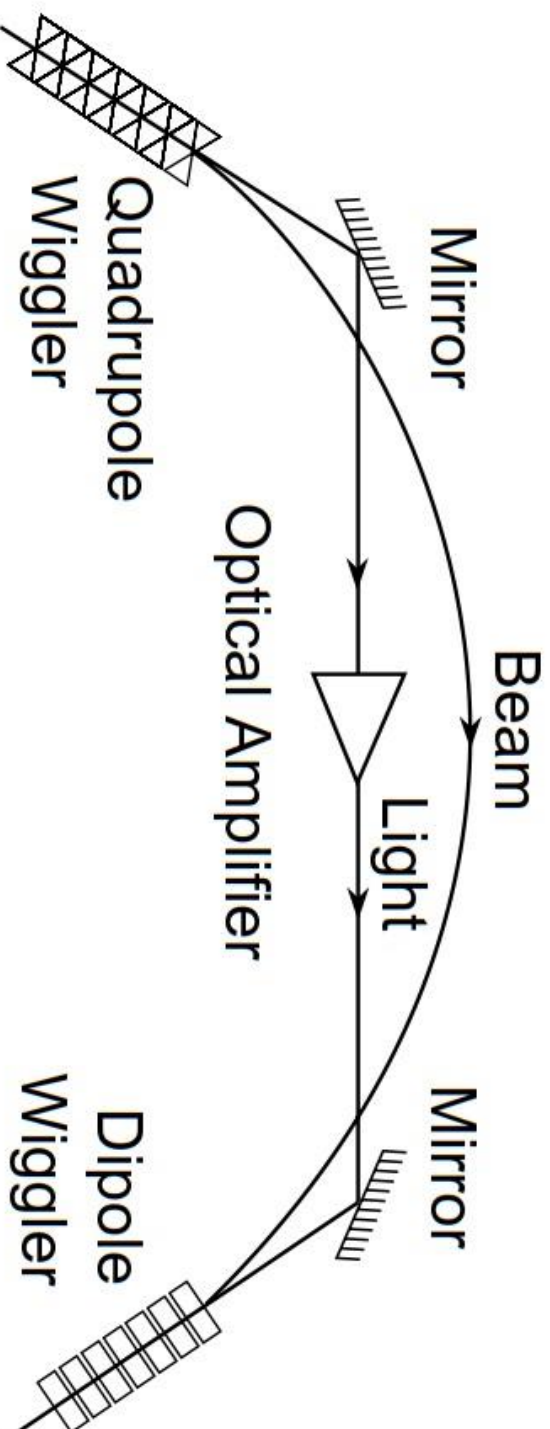
**OPTICAL STOCHASTIC COOLING
HARDWARE
as of September 29 2017**

THE CONCEPT

(Reminder)

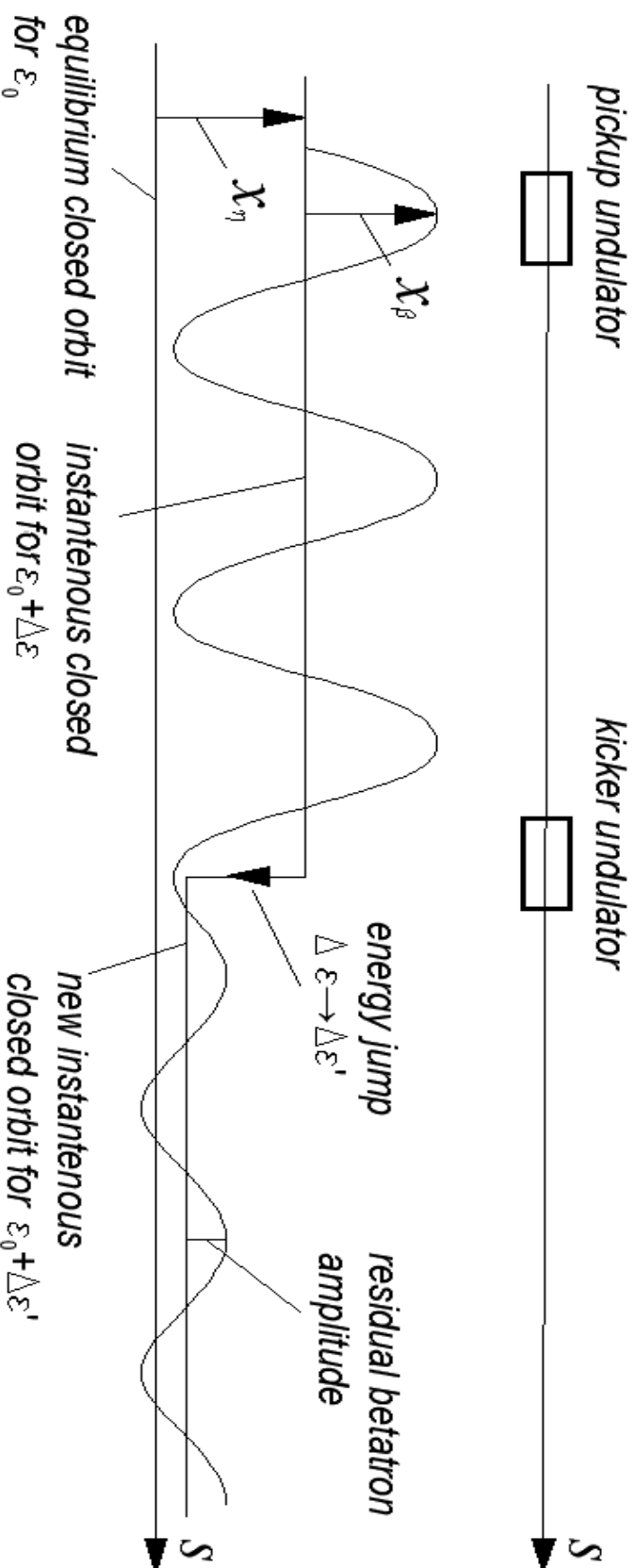
Optical Stochastic Cooling (OSC) system is a kind of fast feedback, which corrects position and energy spread of particles within the bunch.

It operates at very high frequency, when the EM wave is nothing else but optical ray, In contrast with usual feedback systems with EM wave as a usual galvanic signal.

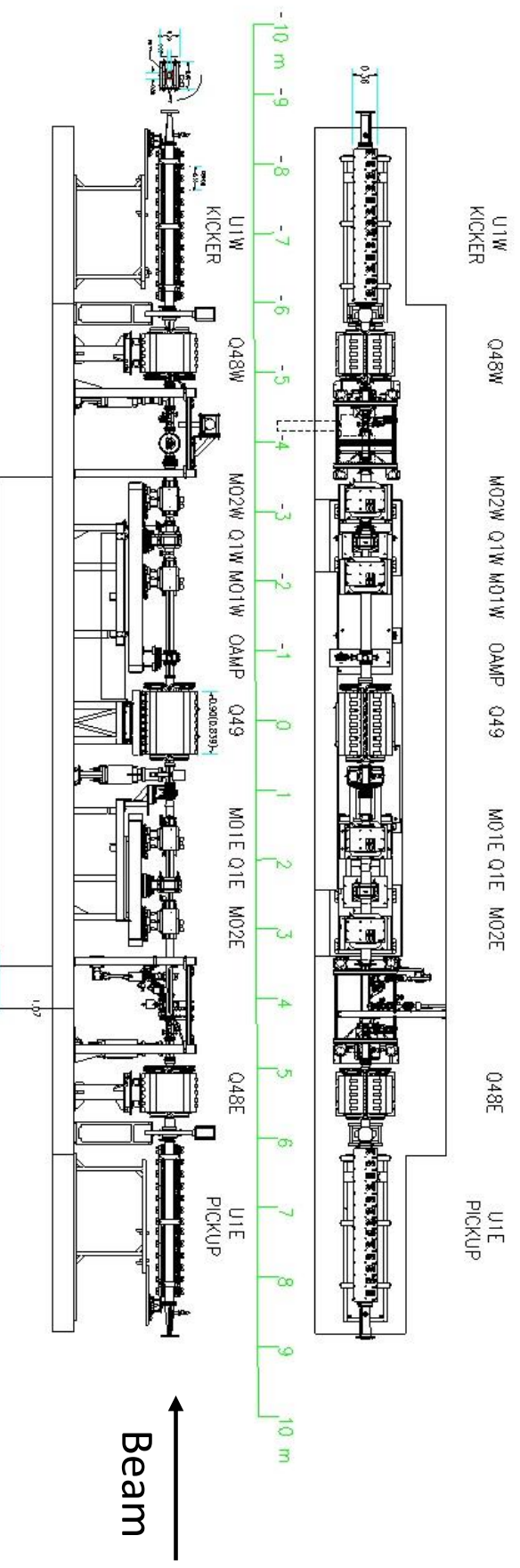
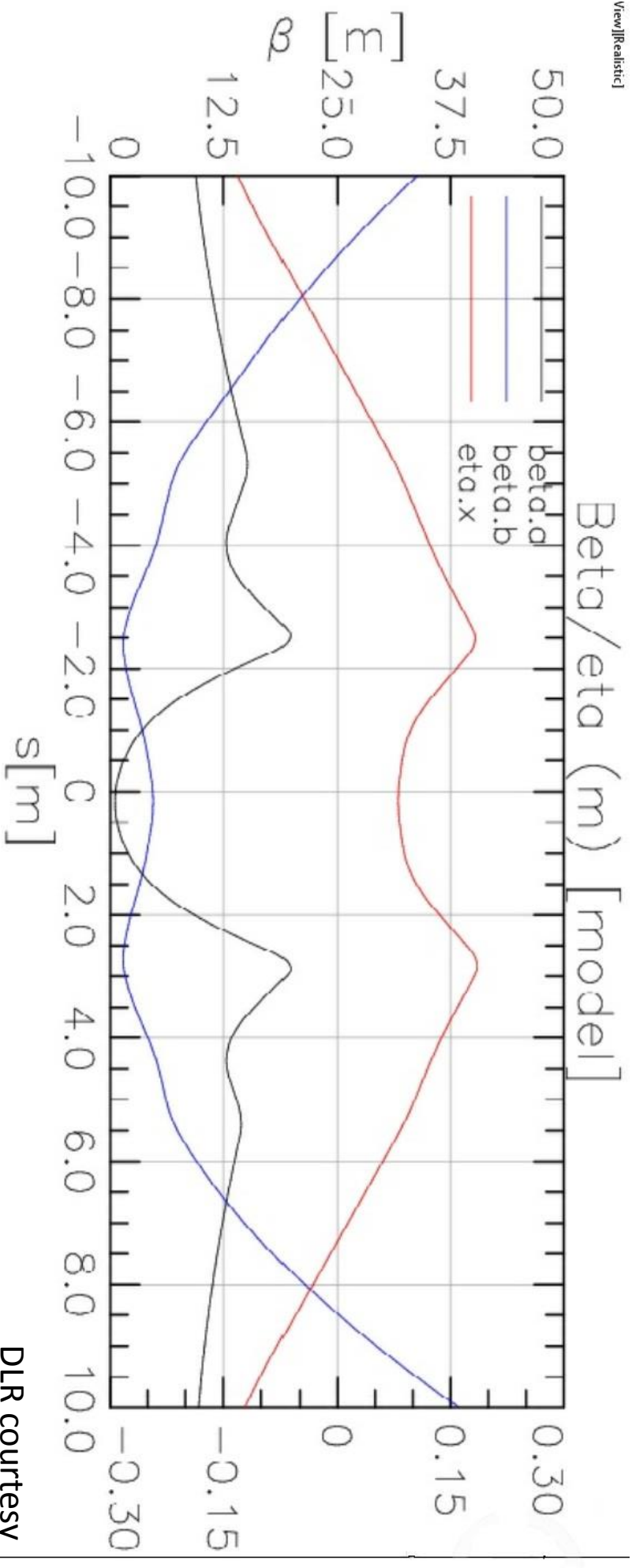


Pickup, amplifier and kicker should operate with optical signals

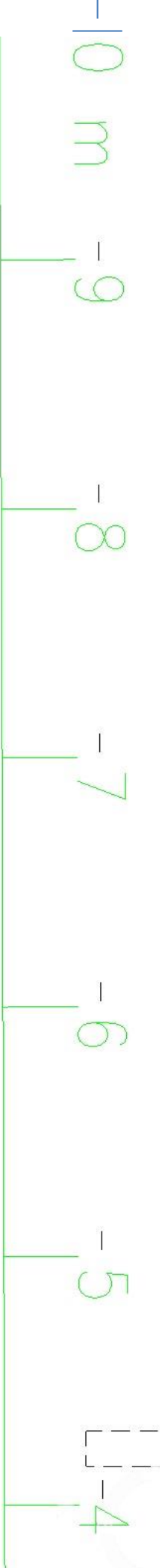
TRANSVERSE KICK BY ENERGY CHANGE



Allocation at CESR's North area



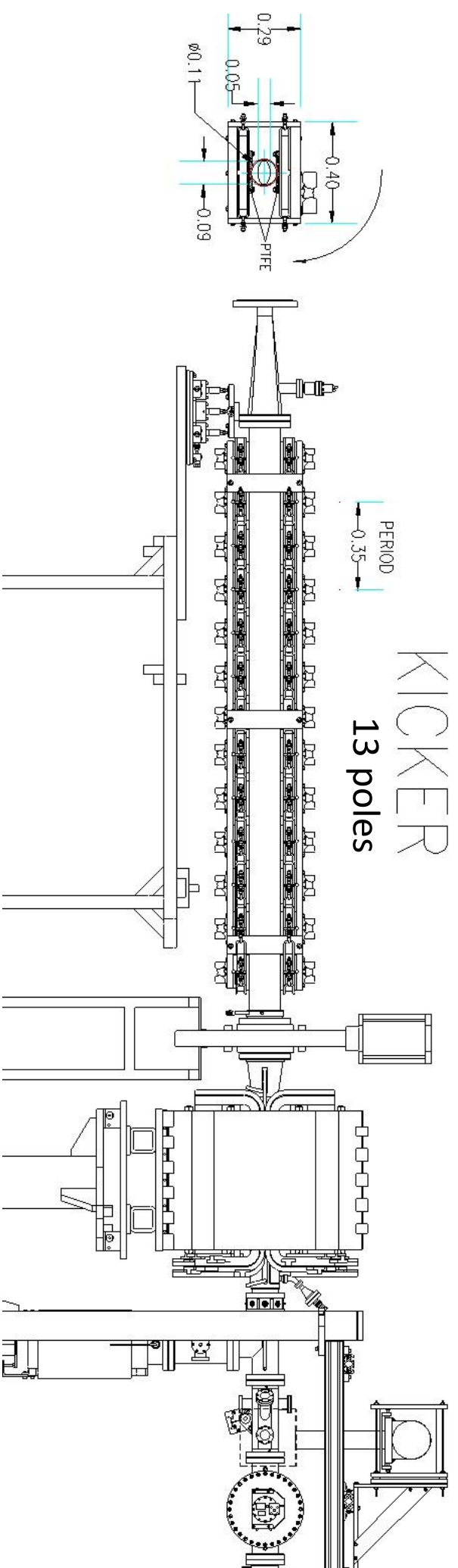
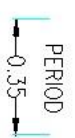
REGION OF KICKER UNDULATOR (The same as a pickup one)



U1W

Q48W

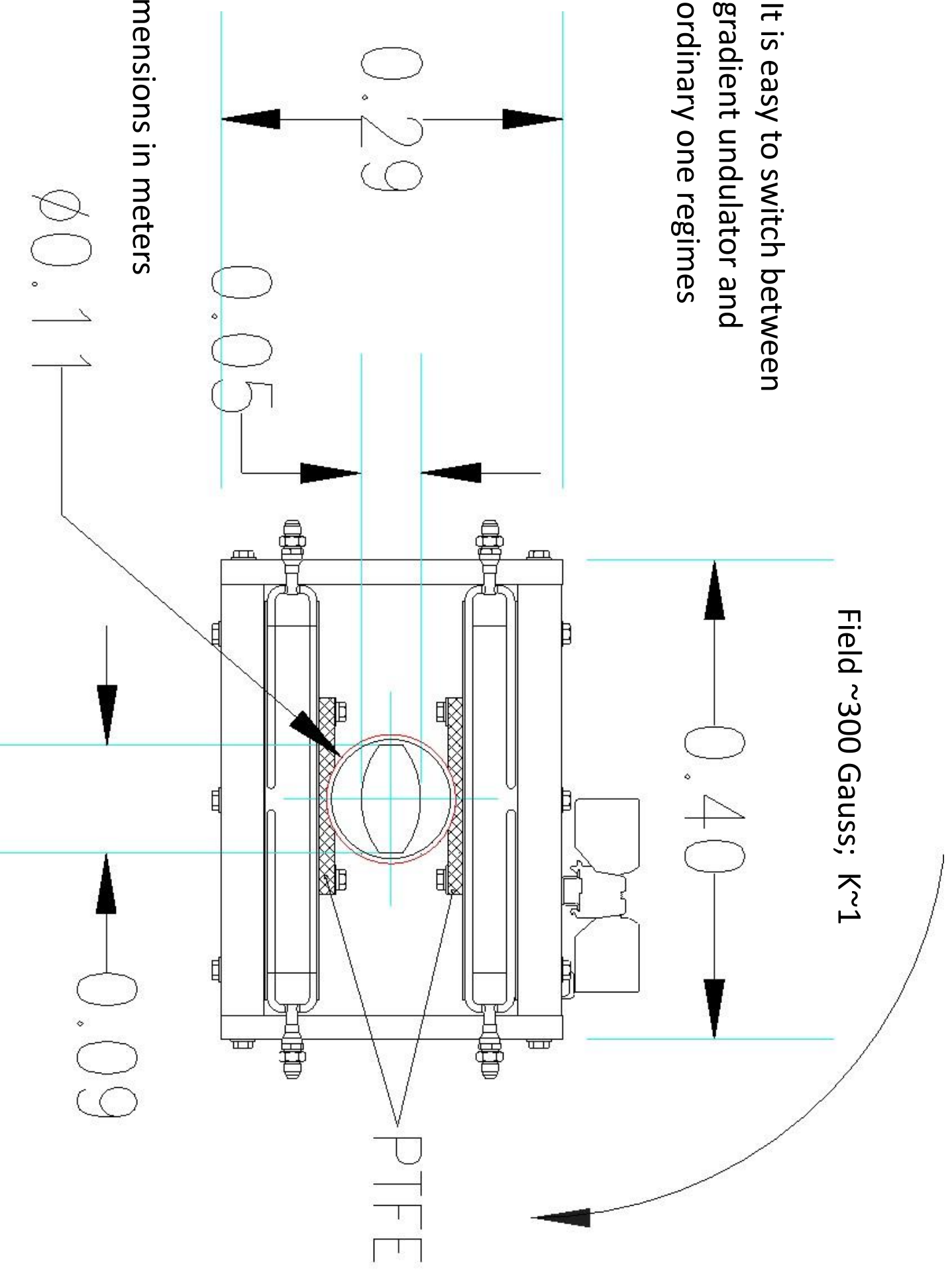
KICKER
13 poles



Field tapering $\frac{1}{4}$; $-\frac{3}{4}$; 1; (± 1) ; $-\frac{3}{4}$; $\frac{1}{4}$ OR $\frac{3}{4}$; $-\frac{1}{4}$
Trajectory remains at centerline while changing K

Undulator design allows different polarizations by mechanical rotation

It is easy to switch between gradient undulator and ordinary one regimes



Field ~300 Gauss; $K \sim 1$

PTFE

Dimensions in meters

$\varnothing 0.11$

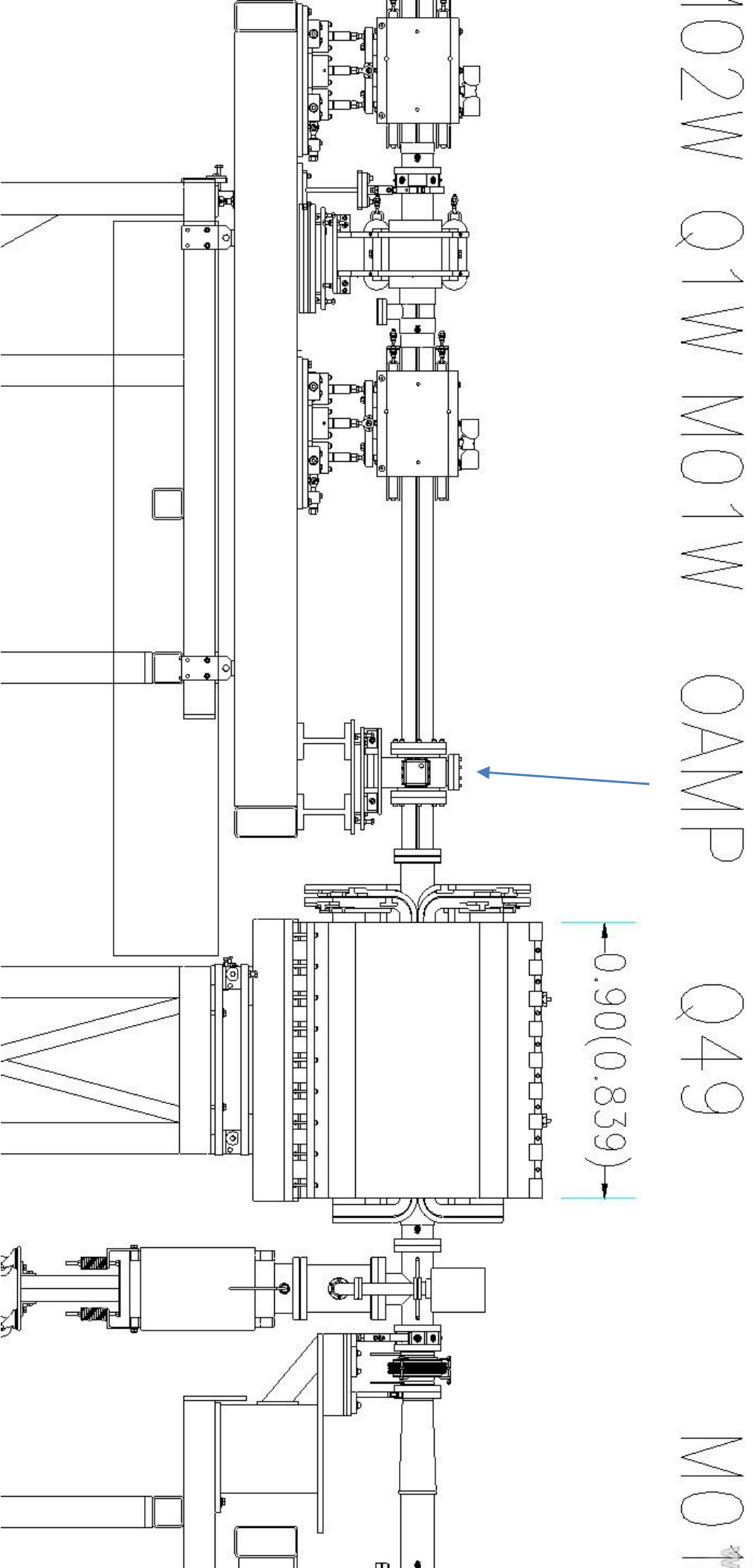
0.09

0.40

0.29

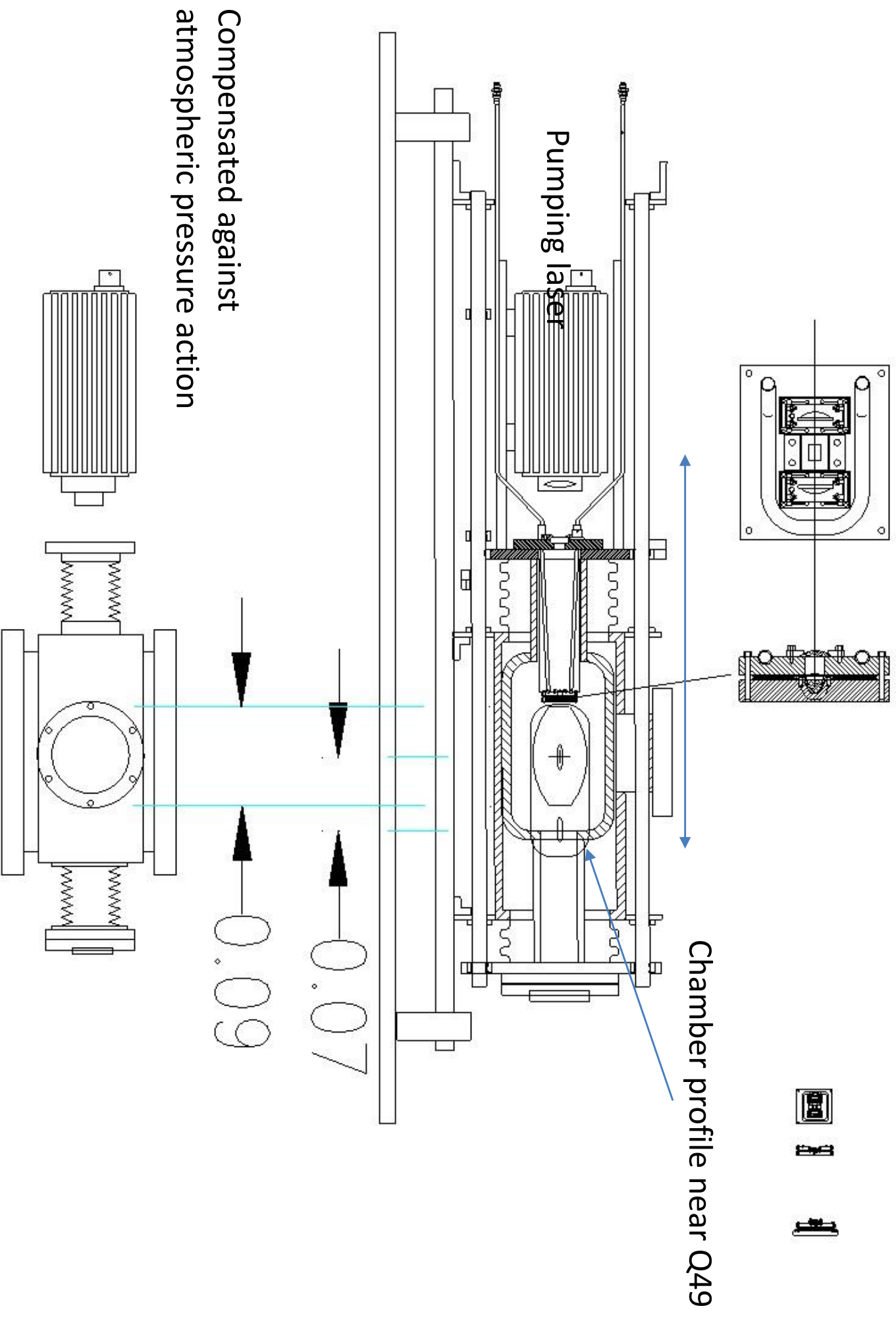
0.05

Region around Optical amplifier (OAMP)

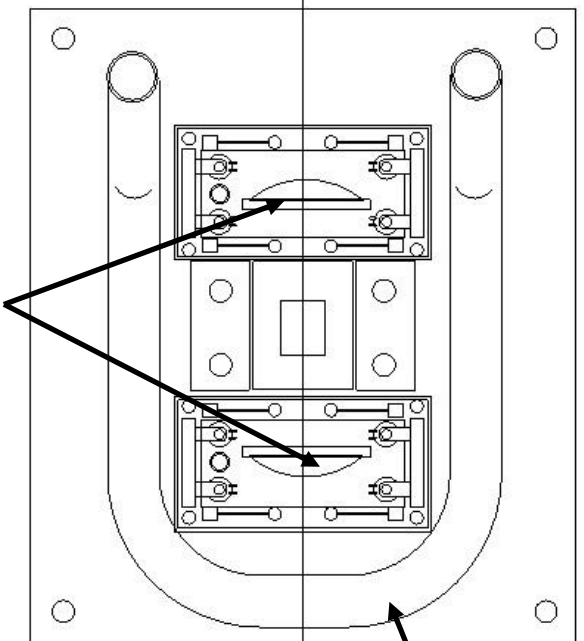


Plenty of room for sextupoles...

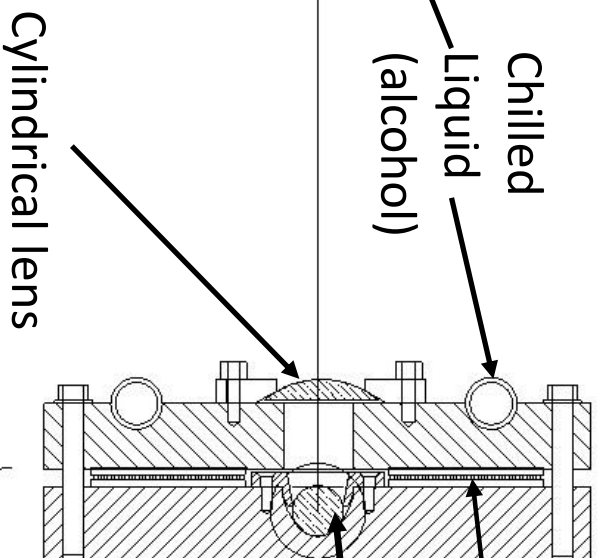
Optical amplifier schematics



OPTICAL AMPLIFIER CONT...



Short focusing lenses

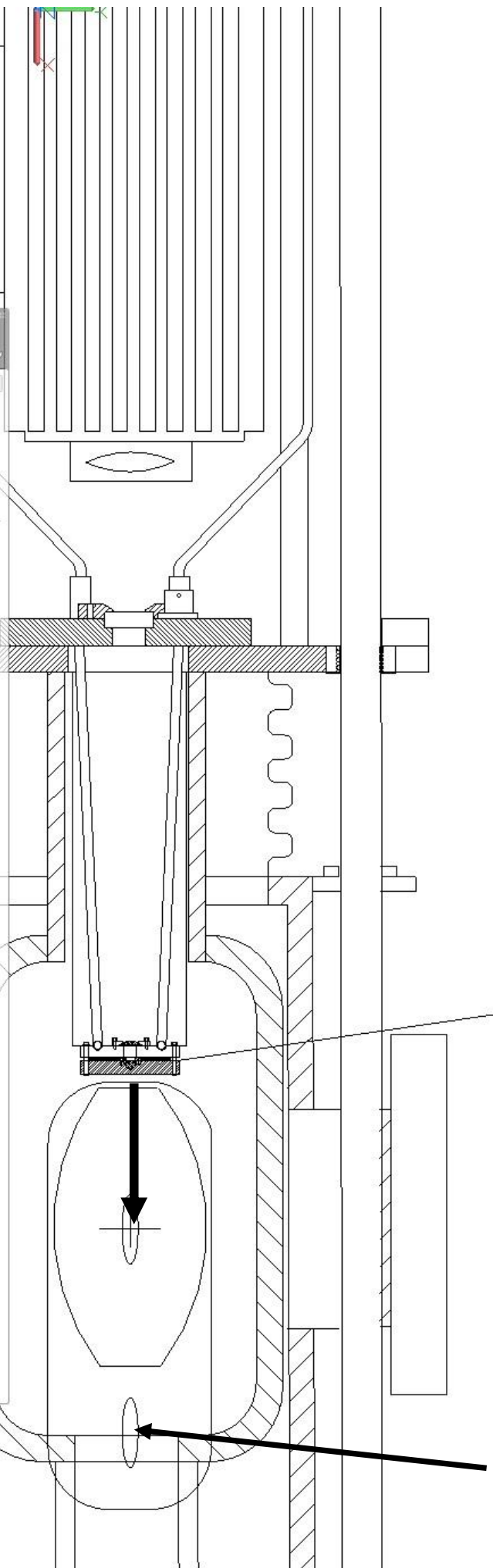


Peltier coolers

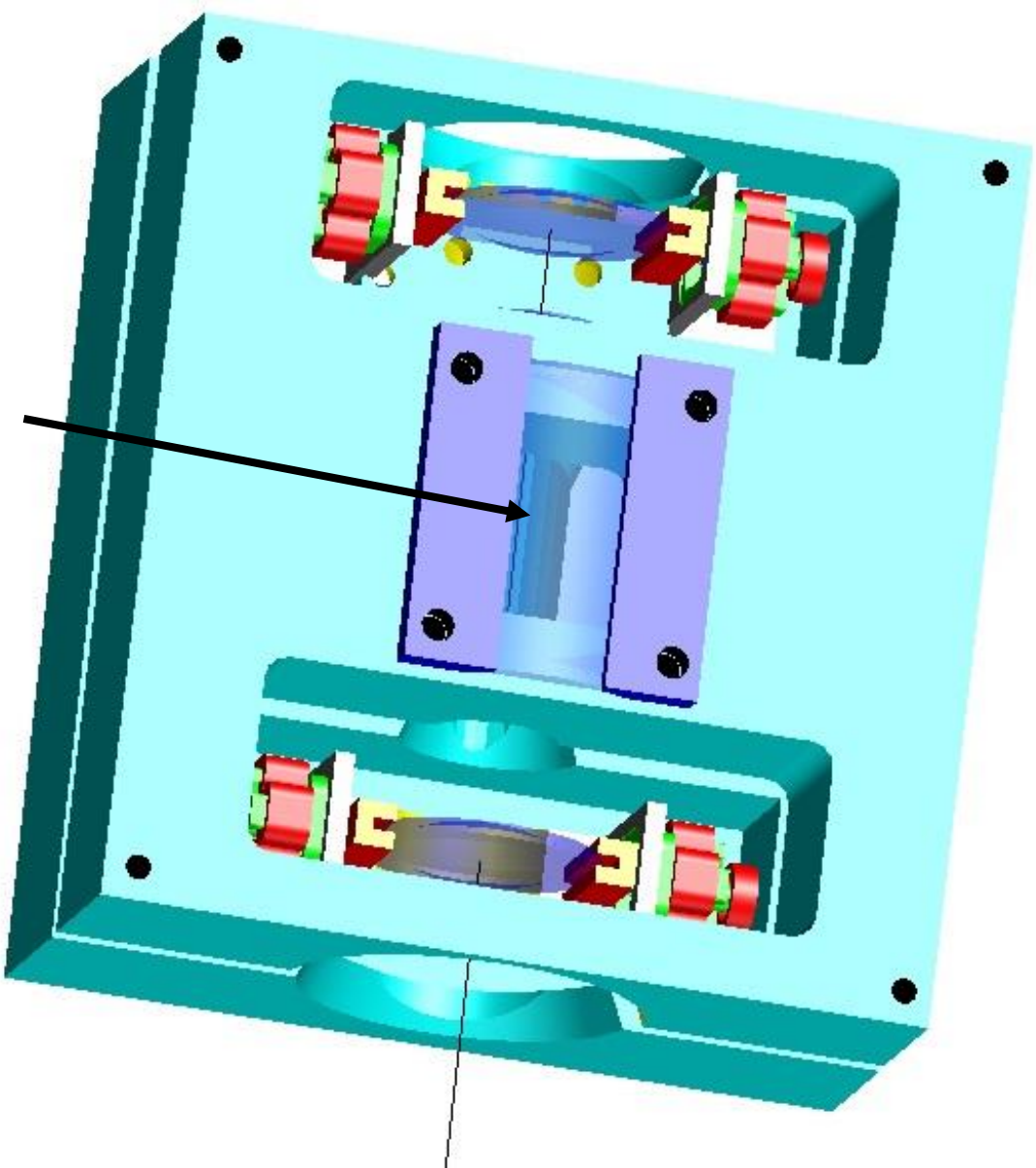
Chilled liquid (alcohol)

Cylindrical lens

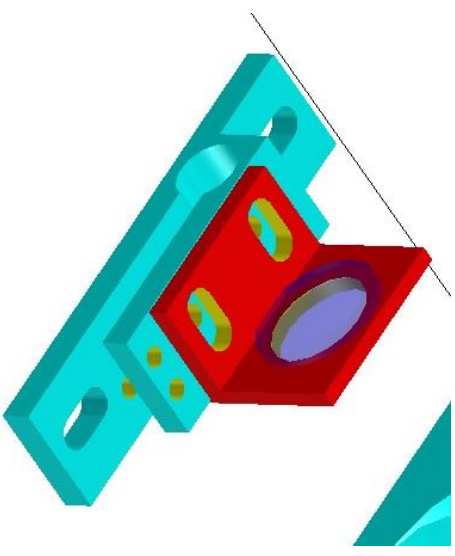
Active media $TiAl_2O_3$
Cylinder $\varnothing 2mm$;
2mm long



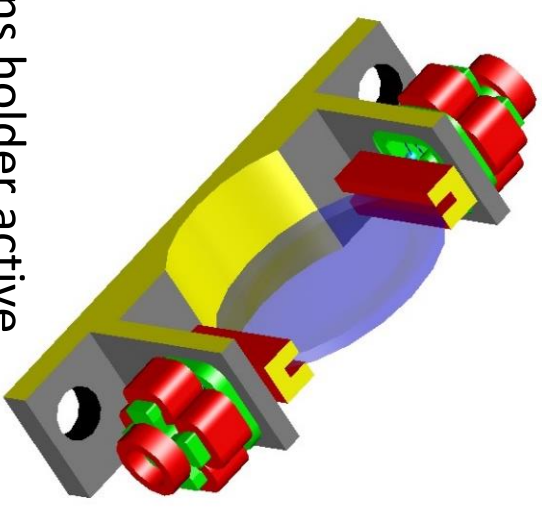
Beam in a bypass



Cylindrical lens and active media behind



Lens holder simplified
Lens holder simplified



Lens holder active

THE END

Different types of OSC

