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REP NEWSLETTER

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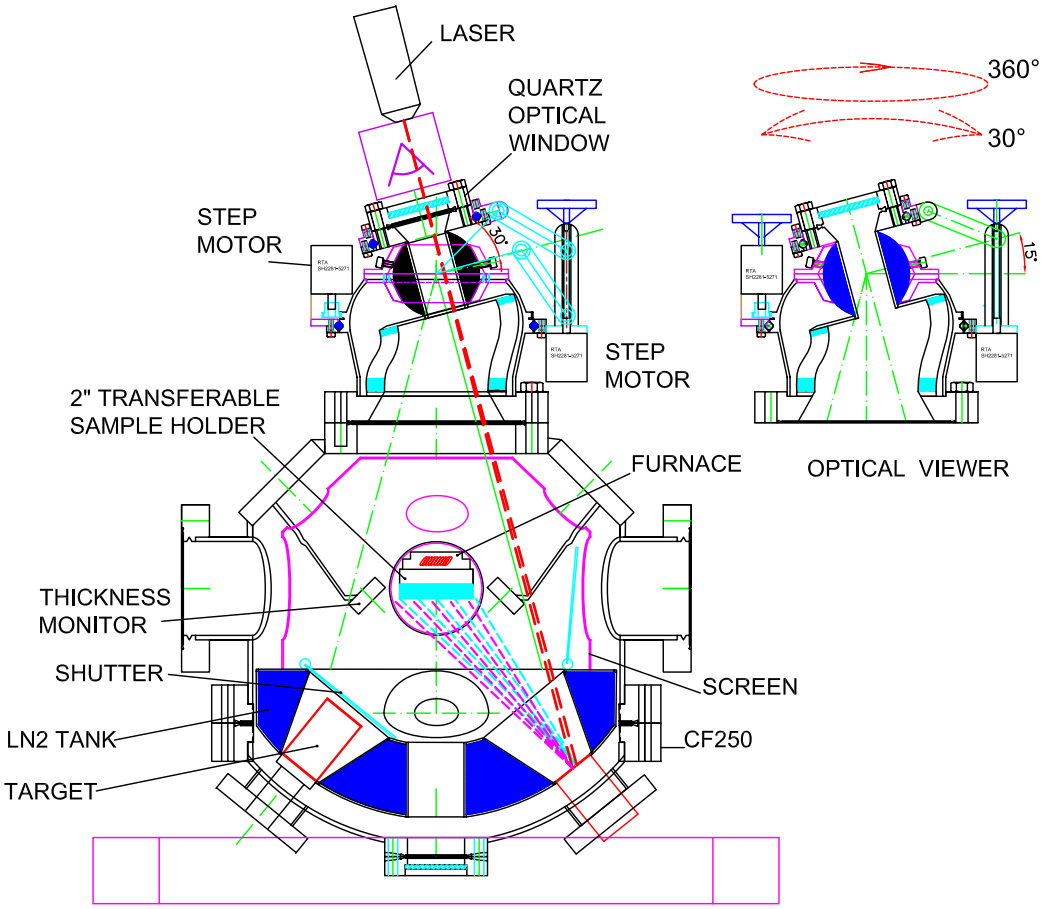
NEW PLD DESIGN

There are many different arrangements to build a growing chamber for Pulsed Laser Deposition (PLD). The target material which is evaporated by the laser is normally found as a rotating disc attached to a support. However, it can also be sintered into a cylindrical rod with rotational motion and a translational up and down movement along its axis. This configuration allows not only the utilization of a synchronized reactive gas pulse but also of a multicomponent target rod with which films of different multilayers can be created.
An other configuration is the use of a carousel, housing different target materials, enables multilayer films to be deposited without the need to break vacuum when changing target.
The application of steradiant viewer (SV) has open new ways to growth thin films
The laser movements outside the vacuum chamber simplify and reduce the difficuty to move the targets inside vacuum
Laser moves along the circonference of the window prolonging the life of the quartz window .
Variable stoichiometry beams are possible manufacturing targets with different materials:
laser rasters the bicomponent target with programmed different times.
Exposing the target in an LN2 cooled well, facing vapour is more collimated on the sample, avoiding the reciprocate contamination on the other targets.
Fast Entry Locks (FEL) allow to introduce new targets without breaking the ultra high vacuum.



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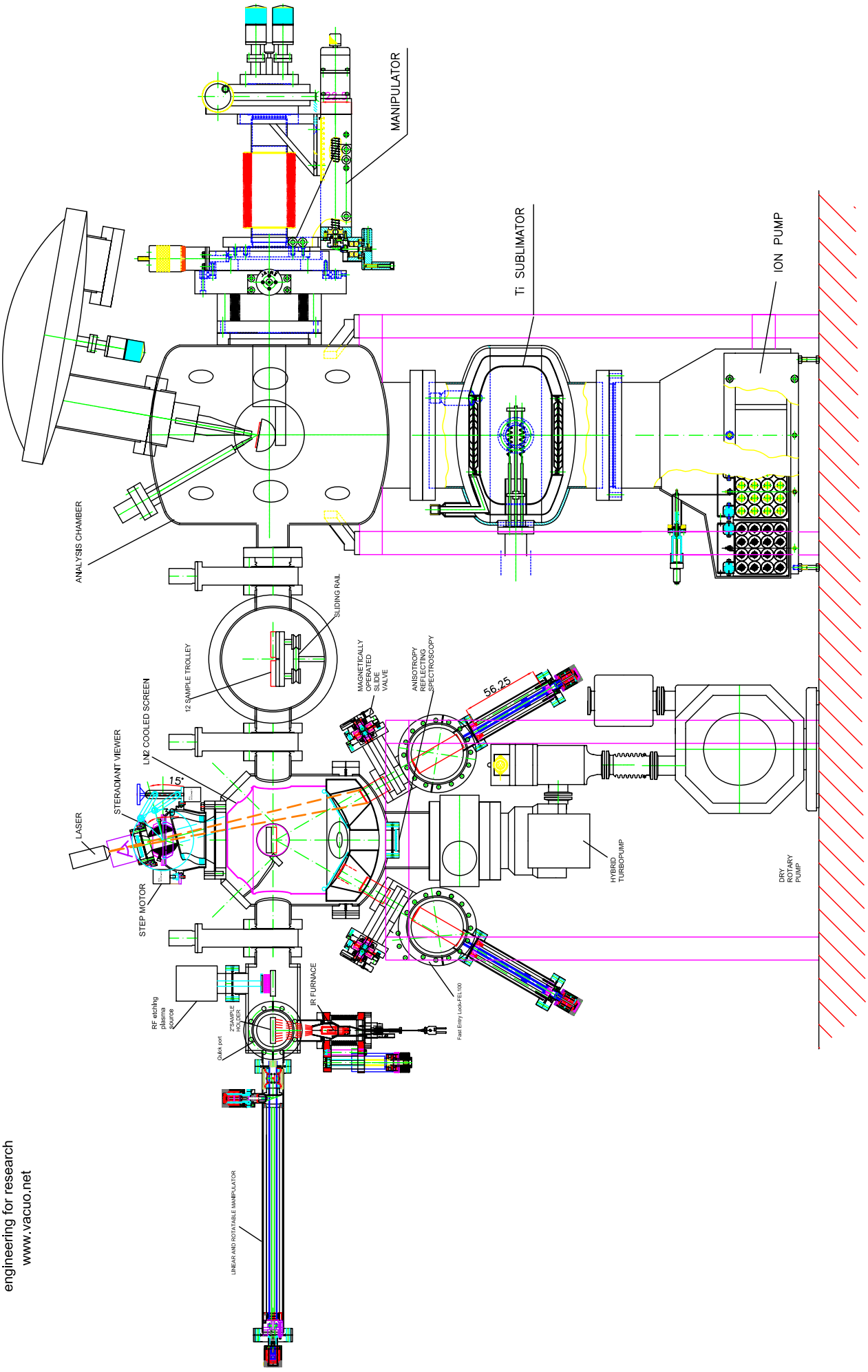

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REP NEWSLETTER

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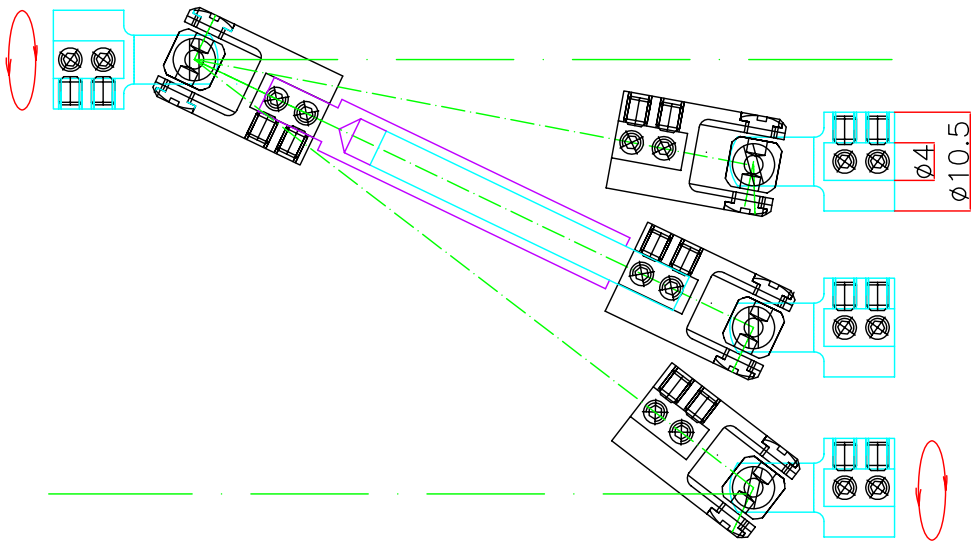
CARDAN JOINT

A universal joint, also said Cardan joint, is a joint or coupling in a rigid rod that allows the rod to 'bend' in any direction, and is commonly used in shafts that transmit rotary motion. It consists of a pair of hinges located close together, oriented at 90° to each other, connected by a cross shaft.

The Cardan joint suffers from one major problem: even when the input drive shaft axle rotates at a constant speed, the output drive shaft axle rotates at a variable speed, thus causing vibration and wear. The variation in the speed of the driven shaft depends on the configuration of the joint, which is specified by some variables.

A double cardan joint consists of two universal joints mounted back to back with a center yoke; the center yoke replaces the intermediate shaft. Provided that the angle between the input shaft and center yoke is equal to the angle between the center yoke and the output shaft, the second cardan joint will cancel the velocity errors introduced by the first cardan joint and the aligned double cardan joint will act as a CV(Constant Velocity) joint.

Inside ultra high vacuum (UHV) movements are difficult due to the lack of lubrication: to overcome this problems we have designed a double Cardan joint with auto lubricating material compatible with UHV.This new application allows to produce new UHV manipulators more simple and cheaper (follow up newletters).



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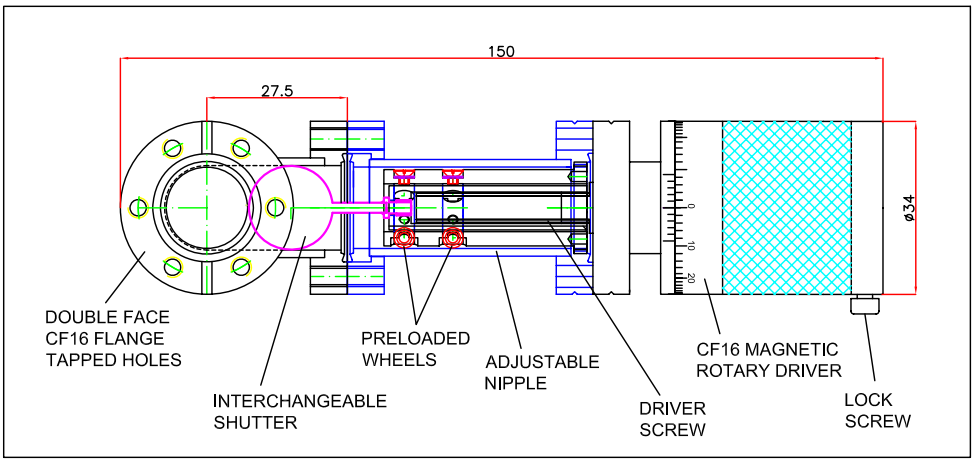
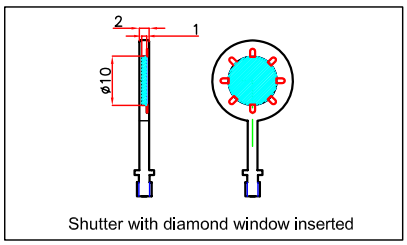
PRECISION SHUTTER

Inside the vacuum system movable shields are suitable to protect viewports, vary the conductance of a pumping line, insert optical filters, to shut down particle beams.To overcome this problem a series of shutters has been designed as a double face flange with threaded holes, exploiting the new rotary magnetic driver.
The chosen materials are suitable for UHV and are bakeable up to 300°C without dismantling the magnets.
Sliding motion is driven by rotary magnetic manipulator with strong magnetic couple so the shutter can be mounted in any attitude with high precision.
The main advantage is that you can install these shutters below the window you have on your UHV chamber,without any modification.
In flag and venetian blind shutters, some parts remain in the field of view all of the time : in our case,when opened,the viewport section is totally free.
The thin shutters are manually operated and can be stopped in any position of the travel with a lock screw.
On request special models are available with step motor.
The shutter terminal is dismountable, so different materials are insertable as molibdenum, tungsten, inconel or optical filter settled into the shutter.
Exploiting the use of CF16 magnetic rotating driver has eliminate the introduction of bellows in the motion system, so you have lower cost and longer life.





Shutter with diamond window inserted

sponsored by : Plasma Physics Lab - CNR , Milan - ITALY

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REP NEWSLETTER

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CARDAN JOINT

VACUO Multiax are UHV manipulators that can have more than six degrees of freedom.
They are realized by the combination of several modules.
Membrane bellows have been eliminated and substituted by magnetic rotator and homokinetic cardan joints allowing to extend the life time and reduce the price.
New materials allow to bake out till 300°C improving the ultimate vacuum in the field of 10*-11mbar.

In fig.1 a 4 axis module has been manufactured:

- X, Y +/-15mm
- Z 100mm
- ϑ rotation 360°
- furnace <900°C
- polarization 1 KV

Sample transfer is made in sliding shape and can be modified in bayonet shape.

Infrared furnace with quartz lamp has been mounted to reach 900°C.
Sample holder can be polarized to 1KV.

fig 2 TM 134 Magnetic Rotator CF40

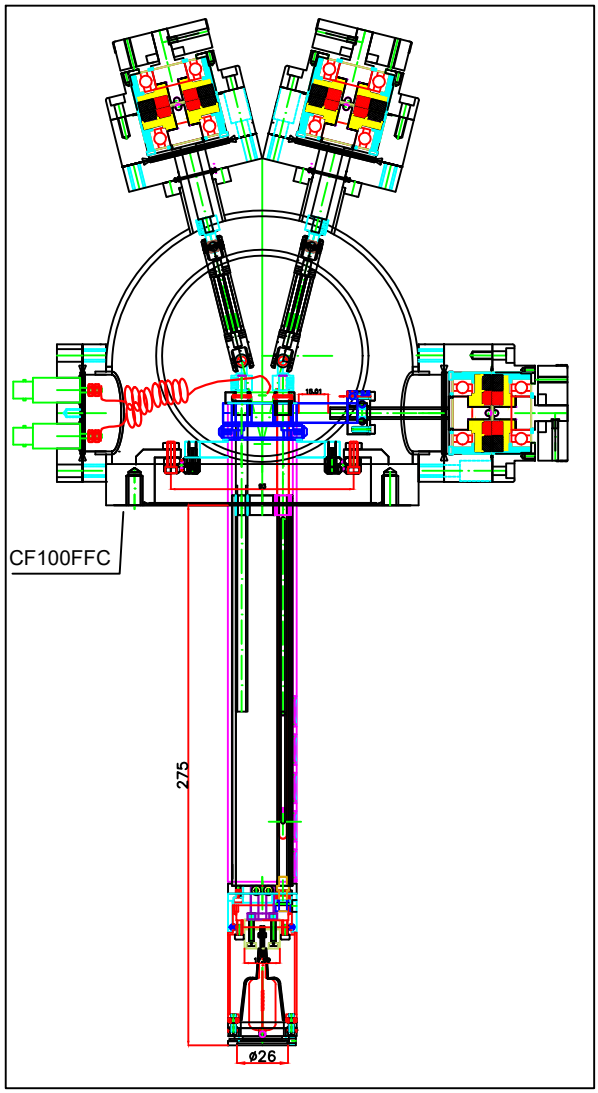

fig 1 MULTIAXIS XY15Z100

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