

Fig. 1: PicoMove optical heads

PicoMove is an ultra-stable interferometer based on a monolithic integrated optics circuits (IOC) glass chip. Its high stability allows the displacement measurement of reflective objects with a sub-nanometer resolution. Figure 2 details the measurement principle of the PicoMove interferometer.

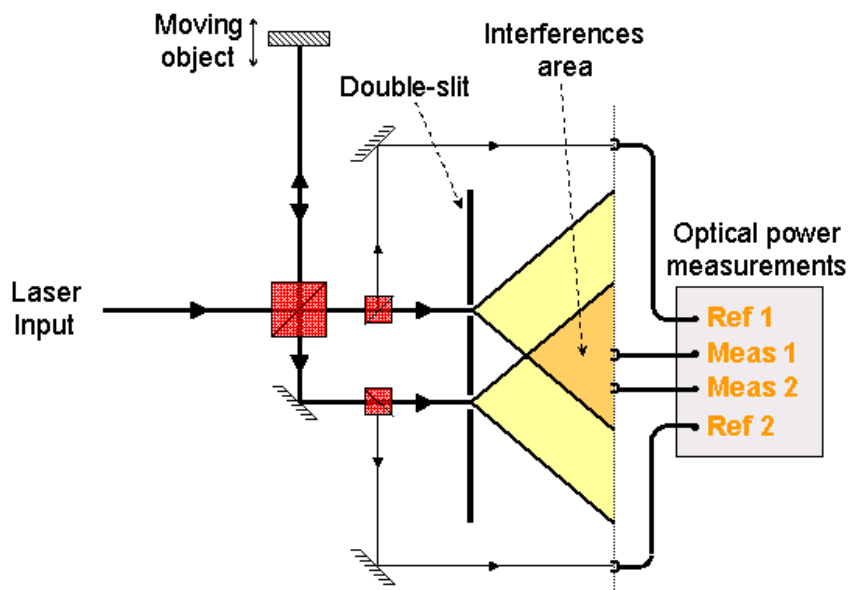


Fig. 2: Interferometer principle

A laser beam is split into two arms: a reference arm with a constant length and a measurement arm that is reflected on the moving object. The length of this latter arm varies with the position of the device under test. An interferences area is then created between the two beams. The optical power is extracted at two predetermined positions of the interferences area, such that, a precise $\pi/2$ phase shift is assured between the two measurements. Figure 3 illustrates the variation on the measurement ports (Meas1 and Meas2) due to a

displacement of the reflective object. This $\pi/2$ phase shift allows determining both amplitude and direction of the mirror displacement.

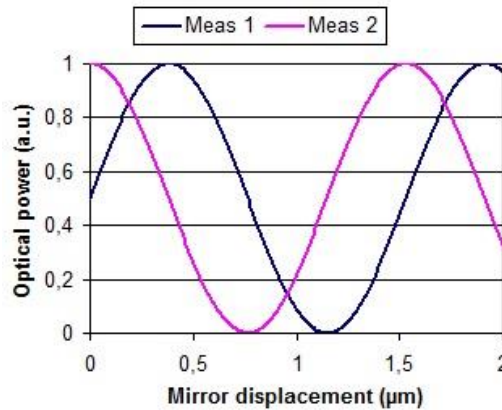
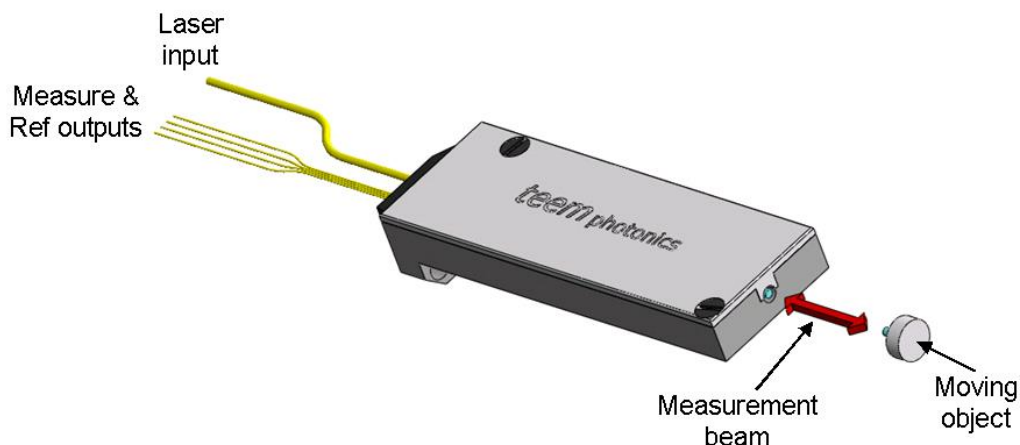


Fig. 3: Measurement ports typical response

Our optical design also offers two reference ports (Ref1 and Ref2) to allow taking into account the possible variation of laser power or reflected light on the moving object in the displacement calculation.

All the optical functions described in figure 2 are monolithically integrated on a compact glass chip thanks to Teem Photonics proprietary ion-exchange technology. As depicted on the PicoMove-IS packaging schematics, all input and output ports are fibered and connectorized (FC/APC connector for the input fiber, SC/APC connectors for output fibers) except the collimated measurement beam which is free space.



Teem can provide a reflective mirror to be fixed on the moving object. Please, contact us for this purpose.

The laser is not provided with the PicoMove interferometer. The wavelength stability of the laser is a key point for a precise measurement of PicoMove. Our suggestions for lasers are:

- Orion™ laser module from Rio Inc. (<http://www.rio-inc.com/products/orion.html>)
- Carity™ laser module from Nano-Giga (www.nano-giga.fr)

Contact us :

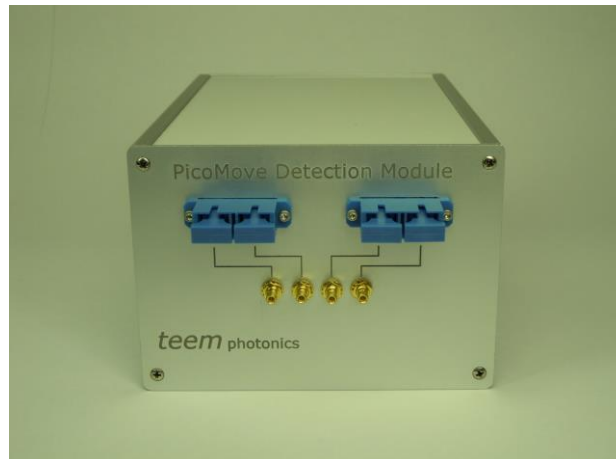
Phone : +33 (0) 476 040 333

Fax : +33 (0) 476 040 302

E-mail: ioc-sales@teemphotonics.com

Web : www.teemphotonics.com

The four output fibers can be connected to our PicoMove Detection Module (PMDM). The module needs a +5/-5V power supply and offers a 500kHz bandwidth on its four analogic SMB output ports.



Picture of PicoMove Detection Module (PMDM), front face