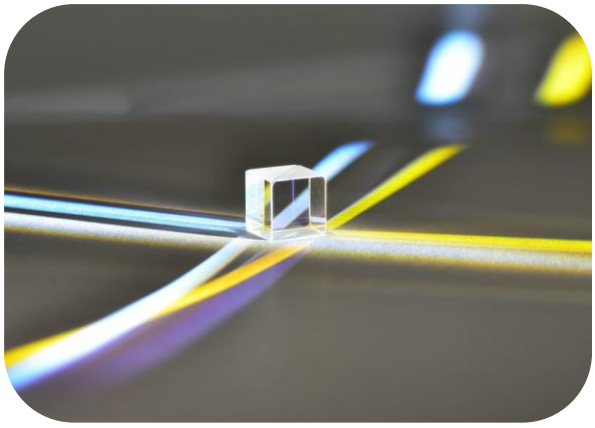
Polarizing beamsplitter (PBS) cubes

Extinction ratio >1000:1 **>15 J/cm² @ 1064 nm**



Polarizing Beamsplitter (PBS) cubes are used to split random polarized beam into two orthogonal and linear polarized components. S- polarization light gets reflected at 90° angle while p-polarization is transmitted through the cube. Each cube is made by assembling two right angle prisms and a dielectric polarizing beamsplitter coating on one of the prisms’ hypotenuse. The incident light falling should always fall on the coated prism first to minimize the energy passing through the optical glue. If the incident light is placed the other way around, the optical glue will need to withstand a few more times more energy to pass through it. This will cause degradation of the glue over a short period of time. It is also common practice to AR-coat enter and exit faces of the cube to reduce light loss.

3photon offers two types of PBS cubes, based on the assembly principle of the prisms:

Standard PBS cubes – glued cubes for low and medium power applications

The interface surface is cemented with optical glue. Because of that, the cubes can only be used for low-medium power applications since their laser damage threshold is >0.3 J/cm² @ 1064 nm. Tp > 95% @ 1064 nm can be achieved, and extinction ratio can be reached up to >500:1.

High power PBS cubes – optically bonded cubes for high power lasers

Special optical contact technology is used to optically bond the interface prisms. This results in a much better laser damage threshold, which is >15 J/cm² @ 1064 nm and then cubes may be used in high power laser applications. Tp > 97% @ 1064 nm (Tp > 96 % @ 355 nm), and extinction ratio can be reached up to >1000:1. In addition, more precise elements are used for high power PBS cubes.

Advantages & Features

- PBS cubes have no beam shifts – that is why they can be easily used in systems with no angle adjustments
- Best performance with monochromatic light source
- Optical paths of transmitted and reflected laser beams are equal

Disadvantages

- Heavy construction – each cube is made of two glass prisms
- Complex manufacturing and more expensive to make in larger sizes
- Incident light needs to be collimated and perpendicular to the first surface
- Accepts only collimated light
- High GDD when used with short pulses

Applications

- Beam splitting & combining.
- Interferometry, distance measurements.
- Fluorescence spectroscopy.
- Imaging systems