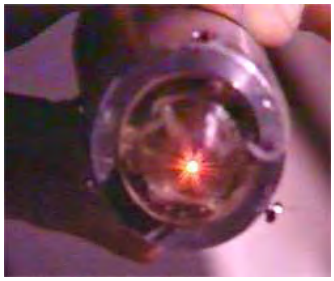
Prizmatix

Fiber-optics for Optogenetics

For *in-vivo* and *in-vitro* stimulation

Ver. 01

Introduction

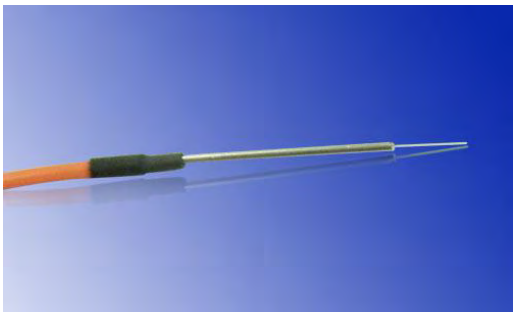


Prizmatix provides a full range solution to the optogenetics *in vivo* and *in vitro* fiber optics. Made of silica or polymer fibers, the high NA fibers are assembled to fit any research set-up with various combinations of connectors, ferrules, core diameters and lengths.

In-vivo fibers - example

This is a Y-shaped fiber for simultaneous in-vivo stimulation of two hemispheres in behaving animals.
Two high NA flexible polymer fibers are accommodated in an FC/PC connector, connected to the output port of a rotary joint. The two fiber branches are terminated with Zirconia ferrules, to connect to the fiber cannulae implanted in the animal's head.

In-vitro fibers - example



This is a single fiber with a thin stainless steel tip at its distal end. A high NA 200µm silica fiber is protruding from the tip for several millimeters. The stainless steel enables anchoring the fiber to a micromanipulator for precise movement and spatial location control. Yet, since the outer diameter of the stainless steel is 3-4 times the core diameter of the fiber, it would have been obscured the image under the microscope. Therefore, we design and build these fibers with the polished bare fiber protruding from the tip for several millimeters, improving the positioning accuracy of the fiber over the target in the brain slice.

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Optional Parameters

- **Fiber specification:**
  - Polymer optical fibers. NA 0.5. Core diameters [µm]: 250, 500, 750,1000, 1500
  - Silica fibers NA 0.53. Core diameters [µm]: 200, 400
  - Silica fibers NA 0.37. Core diameters [µm]: 100
- **Fiber length:** as required, usually 1-1.5 meters.
- **Connectors:** SMA, FC/PC
- **Number of branches:** 1, 2, 3.
- **Ferrules material:** Stainless, Zirconia
- **Ferrules core [mm]:** 2.5, 1.25, Custom
- **Stainless steel tip diameter [mm]:** 0.5 - 2.0
- **Stainless steel tip length [mm]:** 10 - 60
- **Fiber protruding length [mm]:** 1 – 10

SPECIFY PARAMETERS WHILE ORDERING

Optional Accessories

Ultra High Power LEDs (UHP LEDs):
The Ultra High Power LED is a light source for fluorescence microscopy and other applications, and is an effective replacement of spectral lamps and lasers in many applications. The LED driver supports CW or external TTL modulation with user-controlled frequency and duty cycle. For more details please see our website:
http://www.prizmatix.com/UHP/ultra-high-power-leds.htm

Beam Switcher:
The Beam Switcher accessory allows for Prizmatix LEDs installed on a microscope to be used either as microscope epi-fluorescence illumination or illuminating a specimen via a fiberoptic probe.
Especially useful for in-situ Optogenetics studies, the Beam Switcher saves cost, space and allows maximum flexibility in experiment design. For more details refer to Prizmatix Website: http://www.prizmatix.com/optogenetics/beam-switcher.htm

Fiber Coupler and Liquid Light Guide Adaptors:
The side port of the Beam Switcher can be easily configured to fiber coupling by means of the FCA Fiber Coupler Adaptor (SMA, CF or ST connector). This adaptor can be easily assembled by a user on the Mic-LED output.
Please see video clip http://youtu.be/iv7dlwLHaUE.

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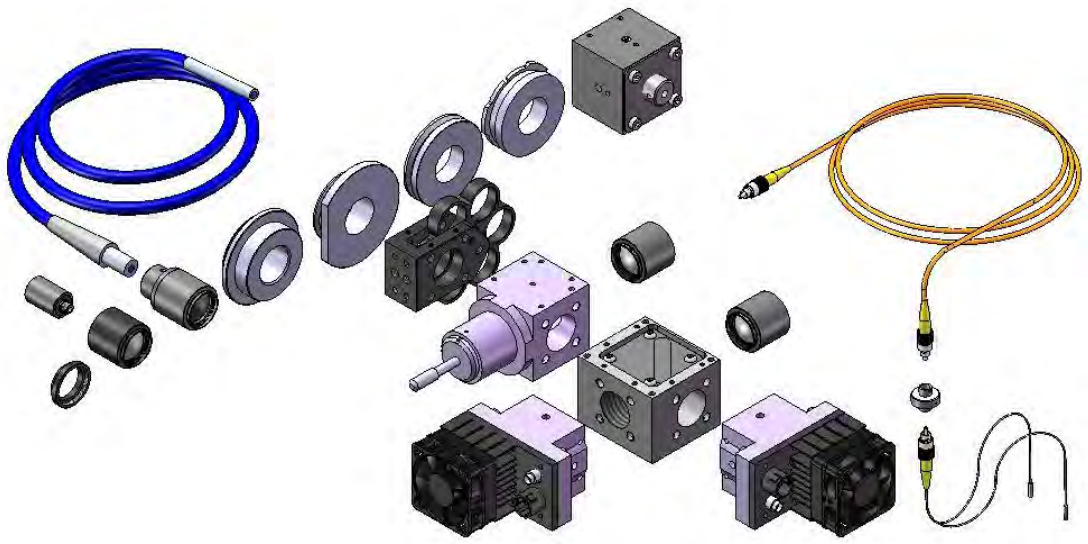
Filter Wheel:

LEDs can be equipped with a 6-positions filter wheel at the beam output, especially useful for the UHP-Mic-LED-White light source. For more details please see our website: http://www.prizmatix.com/uhp/uhp-mic-led-white.htm

Rotary Joint:

Prizmatix Rotary Joint is especially designed for Optogenetics experiments with High NA fibers equipped with FC connectors. Rotary Joint very low friction and smooth swivel operation are demonstrated in this video - http://www.youtube.com/watch?v=q5RE14fove0, showing continuous rotation for over 30 seconds after a fingertip startup.

The torque required for free movement is very low thus reducing the Rotary Joint's behavioral effect on free moving animals. Prizmatix Rotary Joint can be used with large core input optical fiber connected to several thin output fibers simultaneously. This allows concurrent delivery of light to separate areas of the brain without loss of power due to the fiber split. For more details refer to Prizmatix Website: http://www.prizmatix.com/optogenetics/rotary-joint.htm



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