CLAIMS

1. A hybrid pump module configured to be coupled to an optical fiber having a core and at least one clad, the pump module comprising:

   – at least one focusing lens in optical path with the optical fiber;

   – plurality of diode modules, each configured to output a multi-mode beam in optical path with the clad;

   – at least one core associated module in optical path with the core configured to provide a function selected from a group of consisting of:

      a) to output a single-mode beam towards the core;

      b) to receive a beam from the core, and to couple the received beam to an output optical fiber;

      c) to receive a beam from the core, and to reflect the received beam back to the core~~,~~; and

      d) to receive a beam from the core, and to reflect a part of the received beam back to the core, and to couple another part of the received beam to an output optical fiber;

      wherein the plurality of diode modules and the core associated module are arranged in at least two rows, such that their output beams are parallel one to another, per each row; and wherein the pump module further comprises:

      at least one polarizer beam combiner, in the path of a first beams' row; and

      ~~d)~~ one or more folding mirrors, each folding-mirror for each additional row, wherein each folding mirror is configured to redirect its corresponding row of parallel beams into the respective polarizer beam combiner.

2. The hybrid pump module of claim 1, further comprises a volume Bragg grating (VBG), configured to narrow and lock beams to a predetermined range of wavelength.

~~3. The hybrid pump module of claim 1 or 2, wherein the plurality of diode modules and the core associated module are arranged in at least one row, such that their output beams are parallel one to another, per each row.~~

~~4. The hybrid pump module of claim 3, wherein in the case of two rows or more, the pump module further comprises:~~

~~– at least one polarizer beam combiner, in the path of a first beams' row;~~

~~– one or more folding mirrors, each folding mirror for each additional row, wherein each folding mirror is configured to redirect its corresponding row of parallel beams into the respective polarizer beam combiner.~~

~~5.~~3. The hybrid pump module of ~~any one of~~ claim~~s~~ 1~~ to 4~~, wherein each of the diode modules comprises:

– a broad area laser (BAL); and

– a BAL associated folding-mirror, configured with an optical path between its associated BAL and the clad~~; and~~

– ~~optionally, at least one lens arranged between the BAL and its associated folding-mirror, configured to adjust shape of the BAL's beam~~.

~~6.~~4. The hybrid pump module of ~~any one of~~ claim~~s~~ 1~~ to 5~~, wherein the core associated module comprises a seed module comprising:

- at least one seed input, configured to be coupled to a seed laser device; and

- a seed associated folding-mirror, configured for optical path between the seed input and the core~~; and~~

- ~~optionally, at least one lens arranged between the seed input and its associated folding-mirror, configured to adjust shape of the seed's beam~~.

~~7.~~5. The hybrid pump module of claim ~~4~~6, wherein the seed associated module further comprises at least one of:

– a beam amplifier configured to amplify the seed beam;

– a tap or a partial mirror, configured to sample the seed beam, and a monitor configured monitor and alert of backward beam transmission; and

– an isolator configured to allow transmission of light in one direction only.

~~8.~~6. The hybrid pump module of ~~any one of~~ claim~~s~~ 1 ~~to 5~~, wherein the core associated module comprises an output module comprising:

- an output fiber, optionally comprising an end-cap element; and
- a folding-mirror associated with the output fiber, configured for optical path between the core and the output fiber~~;~~
- ~~optionally, at least one lens, arranged between the output fiber and its associated folding-mirror, configured to adjust shape of the received core beam; and~~
- ~~optimally, a pump dump~~.

~~9.~~7. The hybrid pump module of ~~any one of~~ claim~~s~~ 1 ~~to 5~~, wherein the core associated module comprises a high reflecting (HR) module comprising:

- an HR mirror; and
- a folding-mirror associated with the HR mirror, configured for optical path between the core and the HR mirror~~; and~~
- ~~optionally, at least one lens arranged between the HR mirror and its associated folding-mirror, configured to adjust the shape of the associated beams~~.

~~10.~~8. The hybrid pump module of claim 7~~9~~, wherein the HR module further comprises an intra cavity modulator arranged between the HR mirror and its associated folding-mirror, configured to modulate the reflected beam.

~~11.~~9. The hybrid pump module of ~~any one of~~ claim~~s~~ 1 ~~to 5~~, wherein the core associated module comprises a partial reflecting (PR) module comprising:

- an output fiber, optionally comprising an end-cap;
- a PR mirror, in optical path with the output fiber; and
- a folding mirror associated with the PR mirror, configured for optical path between the core and the PR mirror~~; and~~
- ~~optionally, at least one lens, arranged between the PR mirror and its associated folding-mirror, configured to adjust the shape of the associated beams~~.

~~12.~~10. The hybrid pump module of ~~any one of~~ claim~~s~~ 1 ~~to 11~~, further comprises at least one heat dispensing element selected from a group consisting of: base surface, ribs, screws, and any combination thereof.

~~13.~~11. A fiber amplifying system ~~[2800,2700]~~ comprising:

- ~~an optical fiber [2840] or~~ a doped optical fiber ~~[2740]~~, comprising a core and at least one clad;
- the hybrid pump module of claim ~~4~~9 ~~[2500] or claim 6 [2300]~~, coupled to a first end of the optical fiber.

~~14.~~ The fiber amplifying system of claim 11~~3~~, wherein the system further comprises ~~:~~

- ~~•~~ at least one selected from: a pump dump, an end-cap element~~; and/or~~

- ~~•~~12. ~~the hybrid pump module of claim 8, coupled to a second end of the optical fiber~~.

~~15.~~ The fiber amplifying system of claim 11~~3~~, ~~wherein the system~~ further comprises~~:~~

- ~~•~~ ~~a Fiber Bragg Grating (FBG), or~~ the hybrid pump module of claim 6,~~11~~ coupled to a second end of the optical fiber~~; and/or~~

13. ~~at least one of: a pump dump and an end-cap element~~.

14. A fiber laser system comprising:

- an optical fiber, comprising a core and at least one clad;
- the hybrid pump module of claim 7, coupled to a first end of the optical fiber; and
- a Fiber Bragg Grating (FBG), coupled to a second end of the optical fiber.

- ~~•~~ 15. The fiber laser system of claim 14, further comprises at least one of: a pump dump and an end-cap element