

Status of the Adelaide High Power Laser Program

overheads by P.Veitch

LIGO-G020363-00-Z

LSC meeting

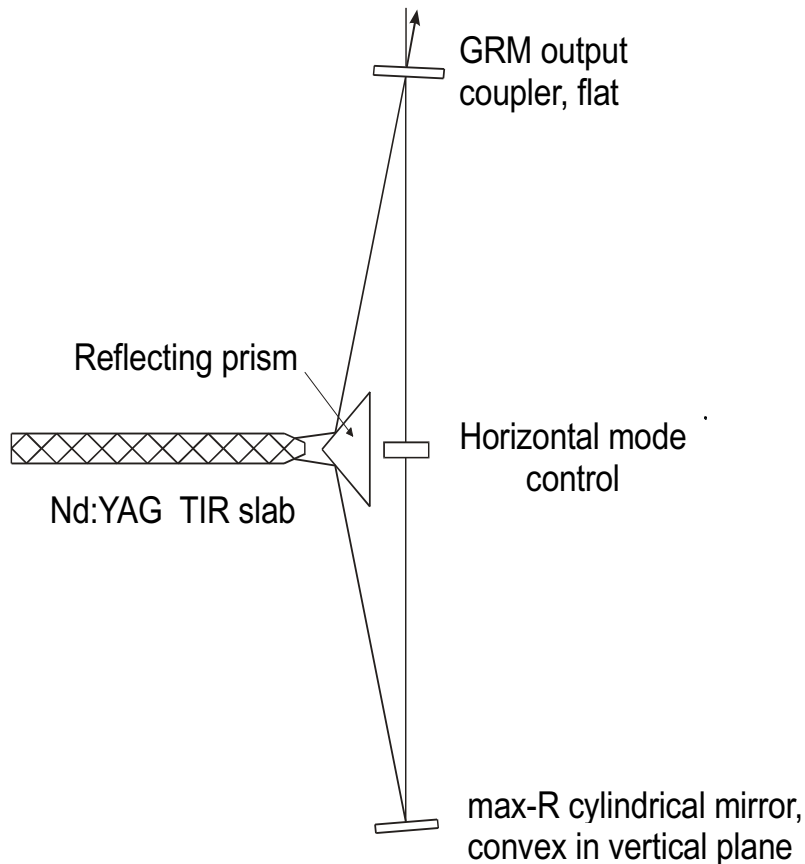
Hanford, Aug 2002

Laser development at Adelaide

Medium power slave laser

- 5 W prototype developed
- long-term injection-locking demonstrated
- diffraction-limited output
- frequency and intensity noise of injection-locked laser meets LIGO 1 specifications
- 10 W brass-board being constructed for Gingin HPTF, TAMA project and injection-locking of high power slave laser
- 10 W laser status: laser partially assembled, lasing has been observed, detailed characterization and optimization in progress, injection locking by November 2002.

100W Laser Configuration



- slab is side-pumped by 520W of fibre-coupled diode lasers
- resonator is stable in the zig-zag (horizontal) direction, unstable in the vertical direction

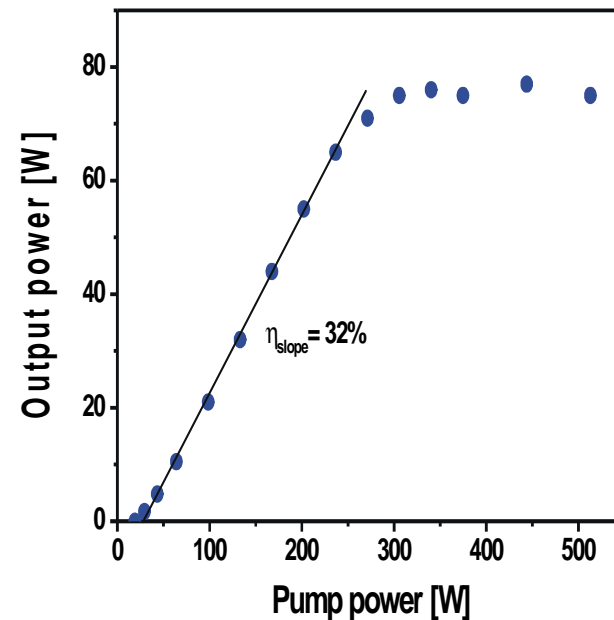


Laser development at Adelaide

High power slave laser

- uses stable/unstable resonator
- 100W-pump proof-of-principle tests completed
 - demonstrated efficiency, operation of stable/unstable resonator and injection-locking
- 500W-pump laser being developed

Results from 2001:



High power laser development

Progress delayed by technical problems with

- **fiber-coupled diode lasers**

- high power causing fibers and mounting in SMA connectors to age
- adjusted coupling of diodes to fibers, individually adjusted fiber orientation to maximize output power and optimize mode profile

- **inhomogeneous pumping of sides of slab**

- solved by using planar waveguide diffusers to homogenize pump

- **current slab out of specification**

- ordered new material, delivery expected end of August
- will be polished by local company