

⑨ Suitable Lasers for Holography

Here is a summary of the types of lasers with a long enough coherence length to be used to make holograms of macro-objects (more than a fraction of a millimeter in depth). See the relevant chapter on each type for more information.

Helium-Neon (HeNe) lasers:

Most polarized HeNe lasers can be used to make decent holograms if allowed to warm up for a half hour or more. A spatial filter will probably be needed (or at least highly desirable) to clean up the beam. The best will be large frame lasers like the SP-124 and SP-127, but internal mirror lasers in enclosed laser heads should be nearly as good with adequate warmup. HeNe lasers produce at most 40 or

Argon or krypton ion lasers:

These have relatively short coherence length unless fitted with an etalon for single frequency operation. However, even etalon argon or krypton ion laser may be acceptable for some holography work. The most useful (highest power) lines would be 488 nm (blue) and 514.5 nm (green).

Diode lasers:

I don't have specific recommendations but some should be excellent if temperature and current controller. Check or ask on the holography forums, below.

Diode Pumped Solid State (DPSS) lasers:

These must be single frequency to be useful for general holography. This is partially due to the typically short cavities of (non-ring) DPSS lasers, and the wide gain bandwidth of most SS lasing materials. DPSS lasers are mostly 532 nm (green). But there are some blue ones at 457 nm or 473 nm. Specific DPSS lasers I know to

- Coherent, C315M (green, up to 150 mW) and with a bit of work, C215M (green, up to 75 mW).
- Coherent 532 (green, up to 400 mW).
- Coherent Verdi (green, up to 18 W). :)
- Uniphase uGreen. (green, up to 50 mW). 4711, and others that have two TECs.
- Melles Griot 58-GSD-309 (green, up to 3 W), 58-BLD-605 (blue, 457 nm, up to 400 mW), and others in the same family. There are also lower power Melles Griot DPSS lasers that should be suitable.

I don't know of any new inexpensive DPSS lasers that are consistently acceptable for holography.

Pulsed Solid State (PSS) lasers:

Holograms can be made with some PSS lasers. While cavity lengths for PSS lasers are usually relatively long (at DPSS lasers), the wide gain bandwidth of the SS lasing medium will mean many longitudinal

modes are able to coexist unless specific means like an etalon are included inside the cavity. I don't know of any specific commercial PSS lasers to recommend, but with minor modifications, the widely available small rangefinder laser, SSY1, has been used successfully for holograms. See the section: [Using SSY1 to Make Holograms](#).