

[54] **LASERS OPTICALLY PUMPED BY LASER-PRODUCED PLASMA**

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[52] U.S. Cl. **331/94.5 P; 330/4.3**

[51] Int. Cl.² **H01S 3/09**

[58] Field of Search **331/94.5; 330/4.3**

[56] **References Cited**
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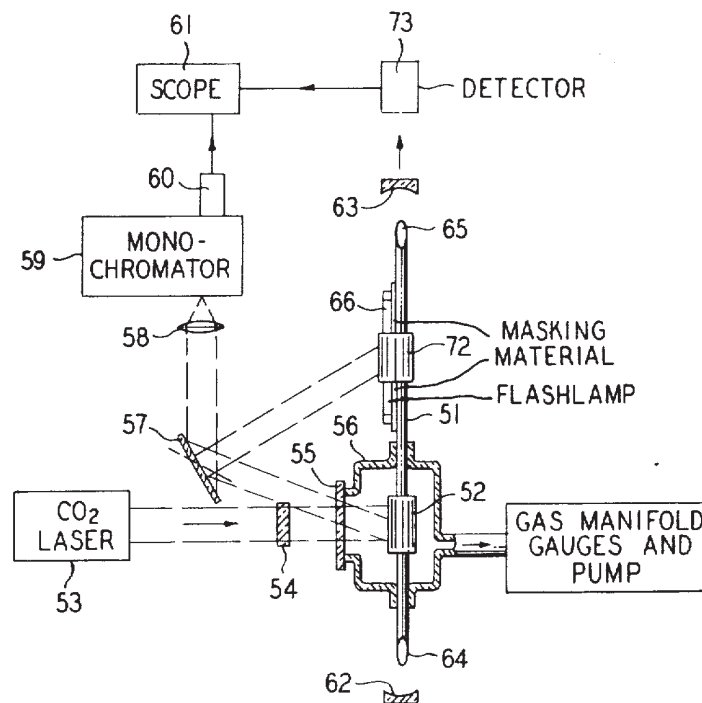
Furumoto et al., *Optical Pumps for Organic Dye Lasers*, Applied Optics, Vol. 8, No. 8, (August 1969), pp. 1613-1623.

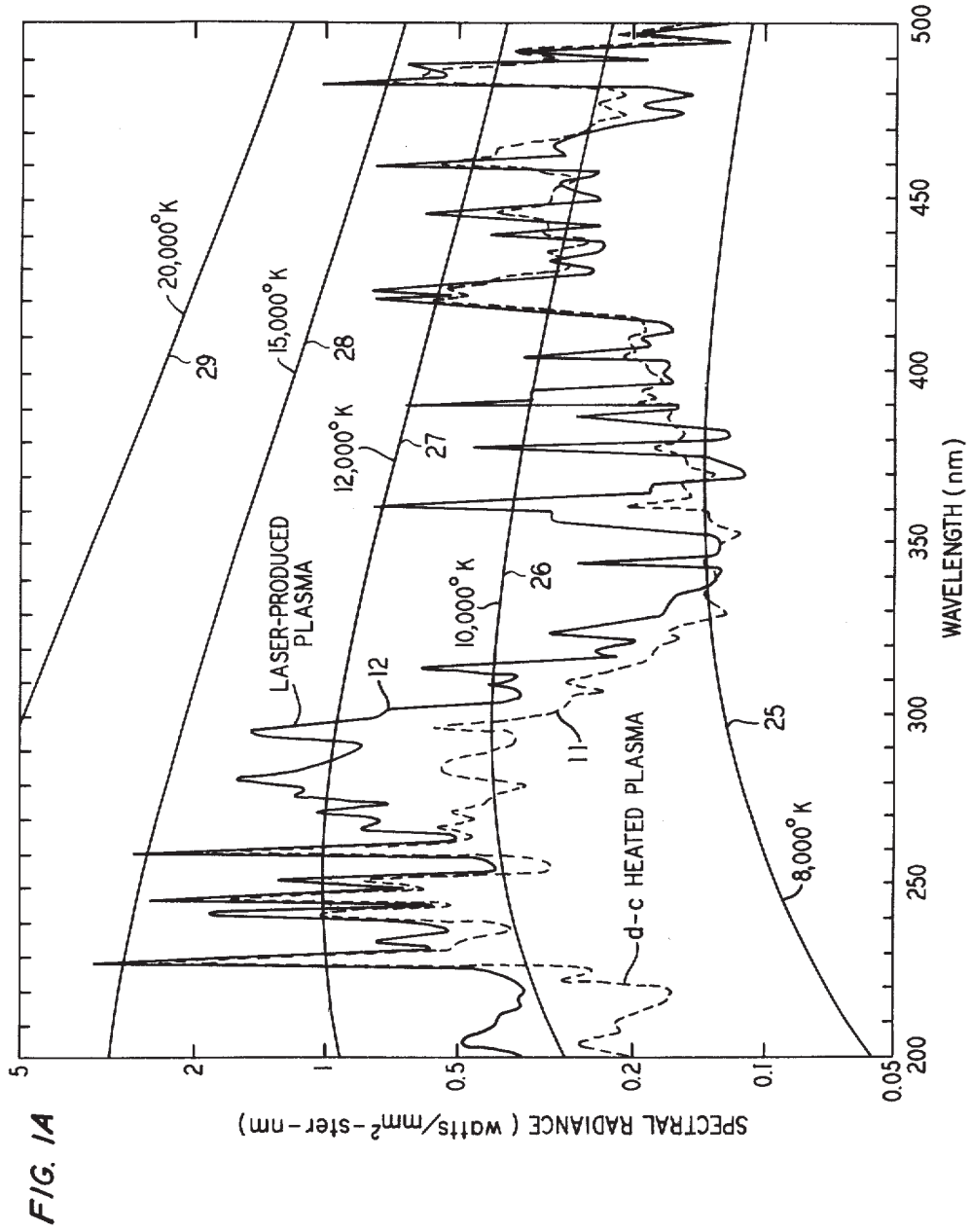
Primary Examiner—William L. Sikes
Attorney, Agent, or Firm—Wilford L. Wisner

[57] **ABSTRACT**

Laser solids, liquids and gases are pumped by a new technique in which the output from an efficient molecular laser, such as a CO₂ laser, ionizes a medium, such as xenon, into a generally cylindrical plasma volume, in proximity to the pumped laser body. Break-down yields a visible and ultraviolet-radiation-emitting plasma in that volume to pump the laser body. The spectral radiance of the plasma is significantly higher than that produced by a d-c-discharge-heated plasma at nearly all wavelengths in the plasma spectrum. The risetime of radiation from the laser-produced plasma can also be significantly shorter than that of a d-c heated plasma. A further advantage resides in the fact that in some applications the attenuating walls needed by flashlamps may be eliminated with the result that laser threshold is more readily reached. Traveling wave excitation may be provided by oblique incidence of the pumping laser beam through the ionizable medium to create sequential ionization of portions of that medium along the length of the pumped laser body.

5 Claims, 12 Drawing Figures





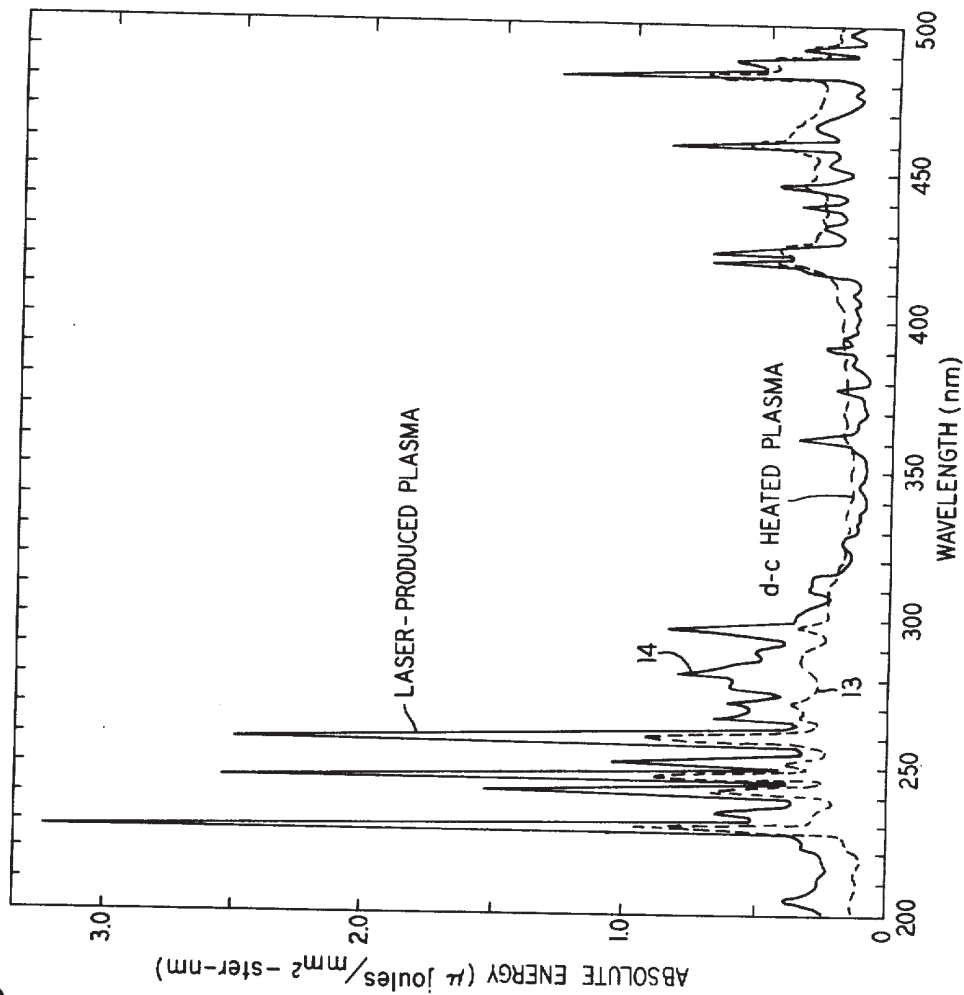


FIG. 1B

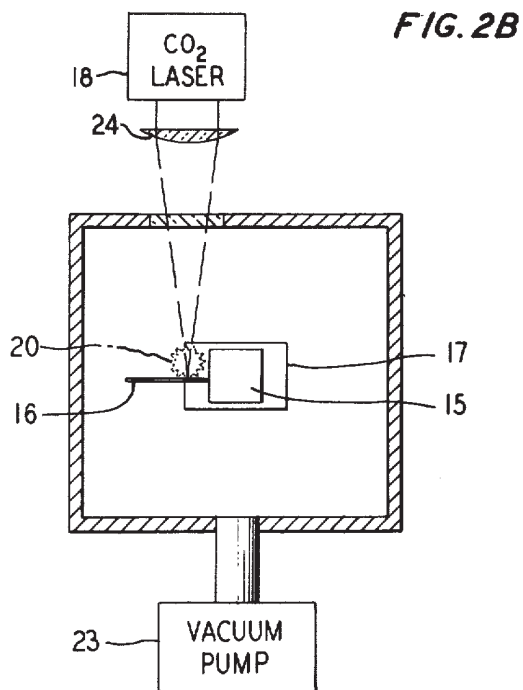
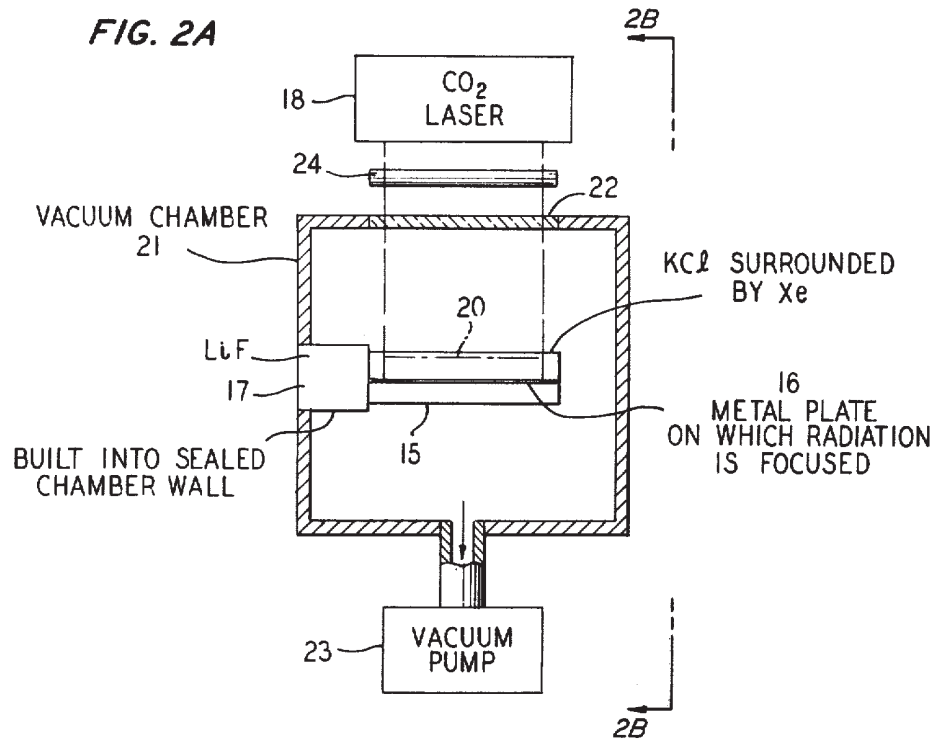


FIG. 3

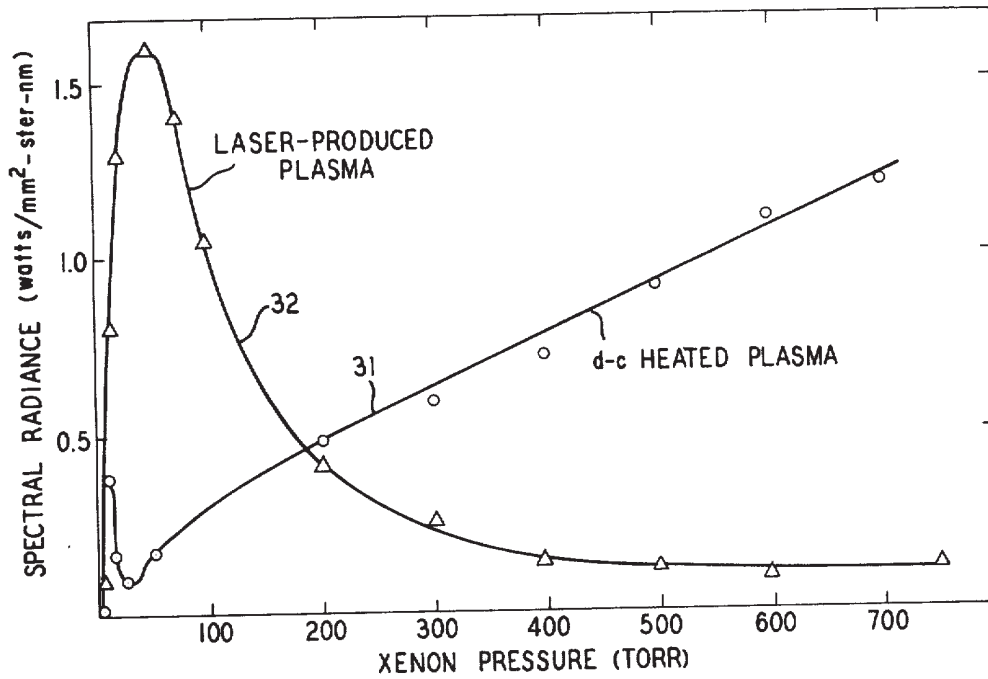
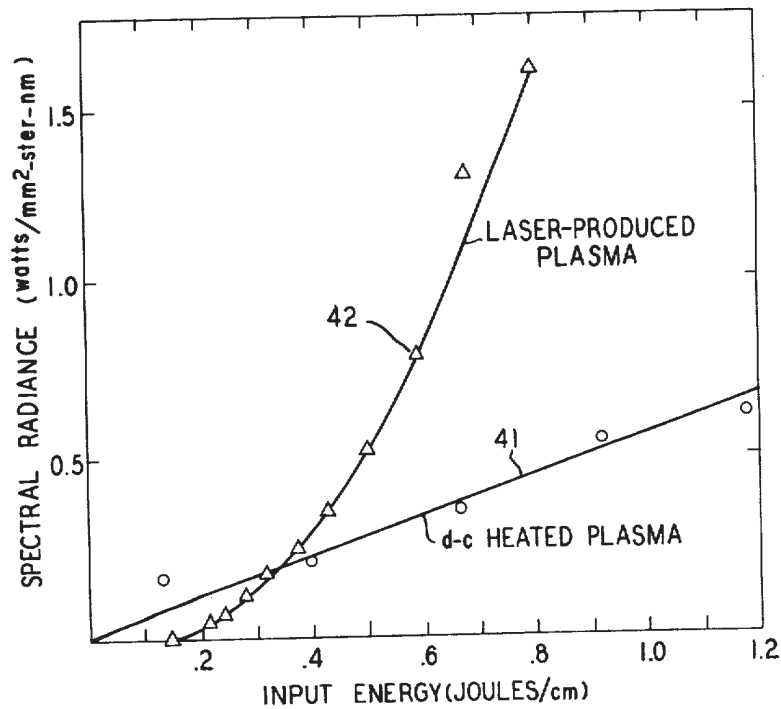


FIG. 4



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