做科研，非一朝一夕
买器材，应速战速决

Newport数千种优质产品当日发货，
更多惊喜尽在PhotonSpeed™光速购！
**AO Q-switched Nd:YAG Laser with One Oscillator-amplifier and Its Laser Transmission System**

CHEN Ying  ZEN Xiang-jiang  WANG Li-xin  WANG Wei-xiang

*College of Laser Engineering* Beijing Polytechnic University Beijing 100022*

**Abstract**  In this paper, a kind of AO Q-switched Nd:YAG laser with one oscillator and one amplifier is studied. The oscillator and the amplifier are composed of two Nd:YAG rod pumped by Krypton lamp and one AO modulator. The maximum average output power is 169 W. Under the condition of repetition rate 1 kHz, the pulse width is 70 ns and the maximum peak power is 594 kW. The laser beam is delivered by an all silica fiber with diameter of 0.6 mm and focused by a group of lenses with new designed. A large scale laser deep engraving is realized.

**Key words**  AO Q-switchedNd:YAG oscillator-amplifier fiber
Table 1 Results of measurement

<table>
<thead>
<tr>
<th>$f$ /kHz</th>
<th>$P_{in}$ /kW</th>
<th>$\Delta t$ /ns</th>
<th>$P_{out}$ /W</th>
<th>$P_p$ /kW</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>15</td>
<td>380</td>
<td>169</td>
<td>20.2</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>190</td>
<td>33.8</td>
<td>177</td>
</tr>
</tbody>
</table>

Fig. 1 Schematic diagram of two-rod and one-AO resonator

Fig. 2 Schematic diagram of oscillator and amplifier
关系式:

\[ d_s = d_f \times \frac{f_2}{f_1} \times \frac{1}{f_4/f_3} \]

\[ f_4/f_3 > 1 \quad d_s < d_f \]

若 \( f_4/f_3 > 1 \)，将使聚焦成为可能。实际上，光纤芯径 \( f_4/f_3 \)，可得聚焦点。经测量总激光传输效率为 86.9%。

图 4 激光光束传输系统

图 5 透镜组

4

4.4 采用振荡 \( Q \)-switched Nd:YAG 激光器及光纤传输聚焦系统

