

# Carbon Dioxide Lasers and Their Applications

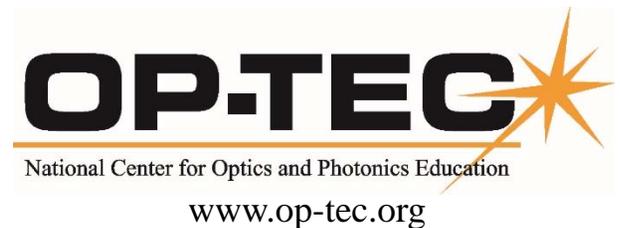
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Module 2-4

of

Course 2, *Laser Systems and Applications*

*2<sup>nd</sup> Edition*



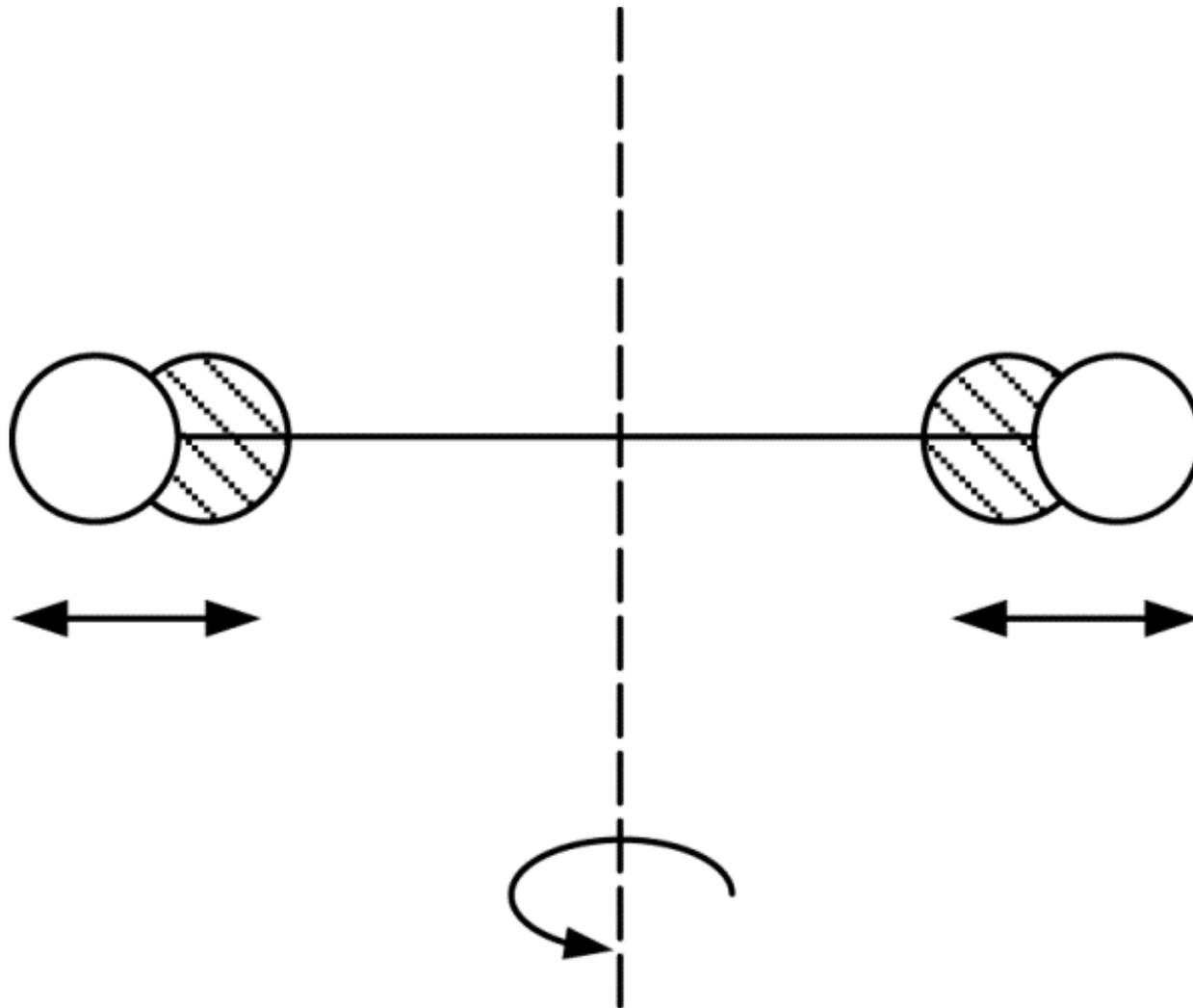
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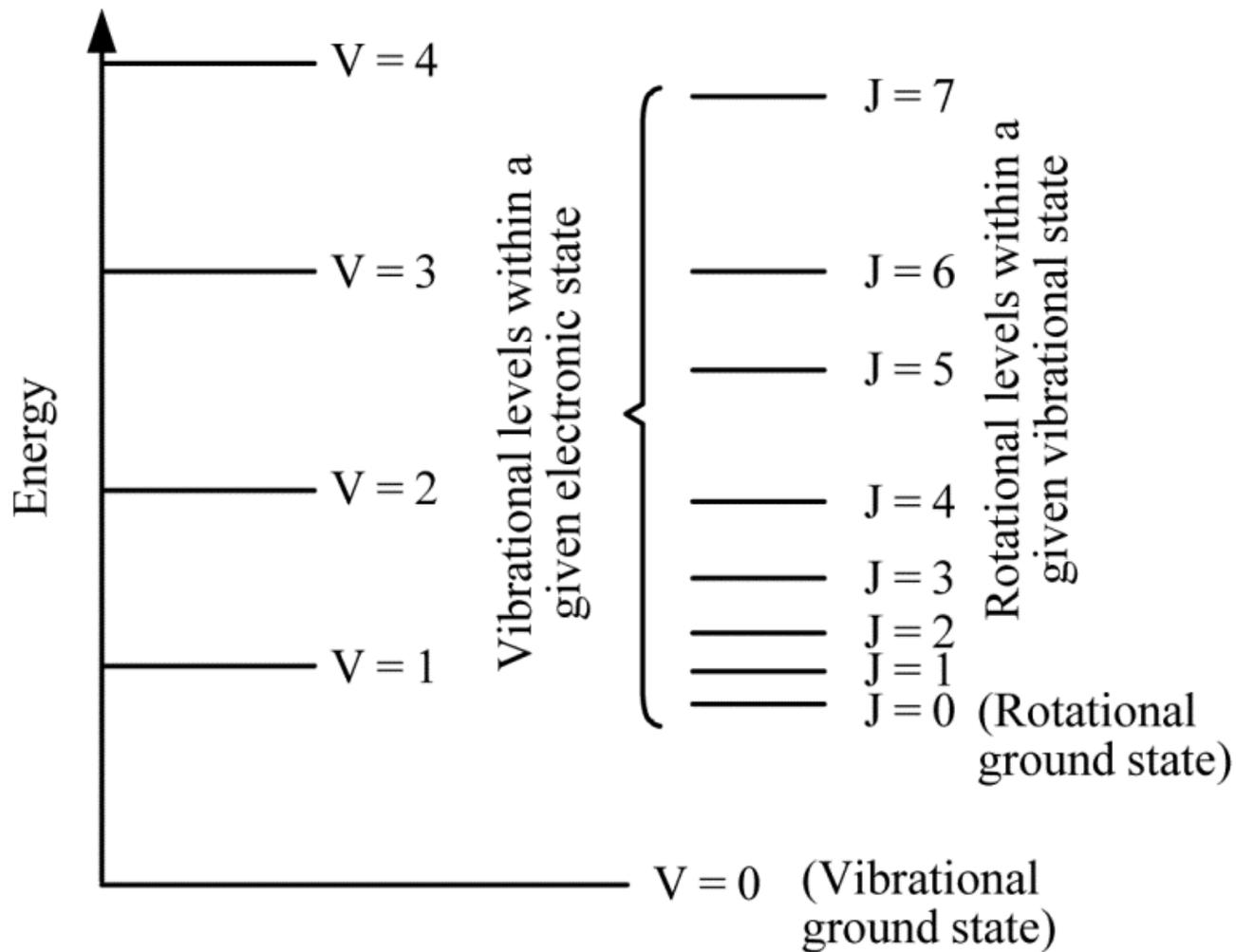
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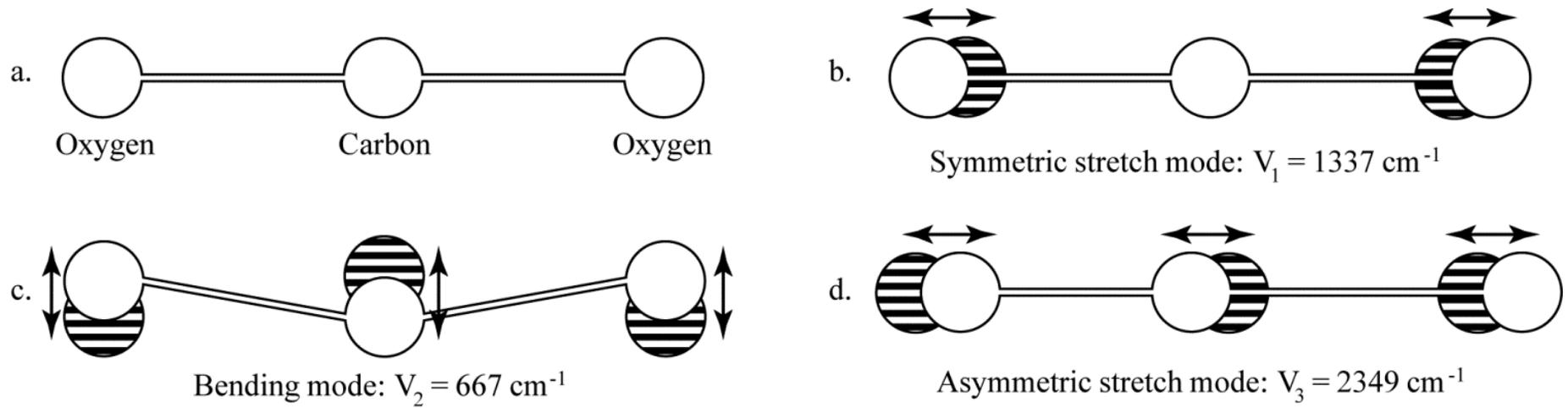
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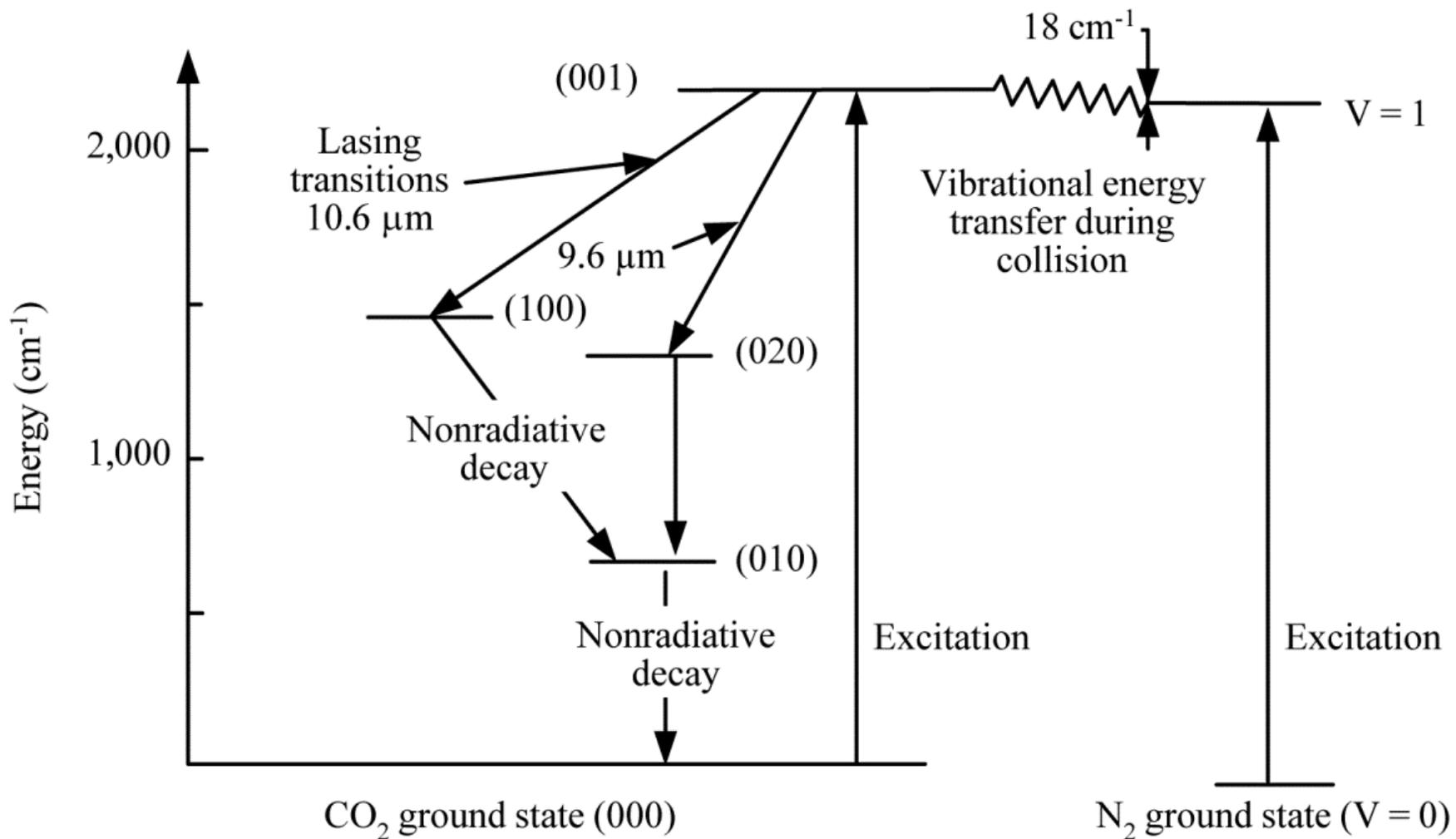
**Figure 4-1** *Vibrational and rotational modes of a diatomic molecule*



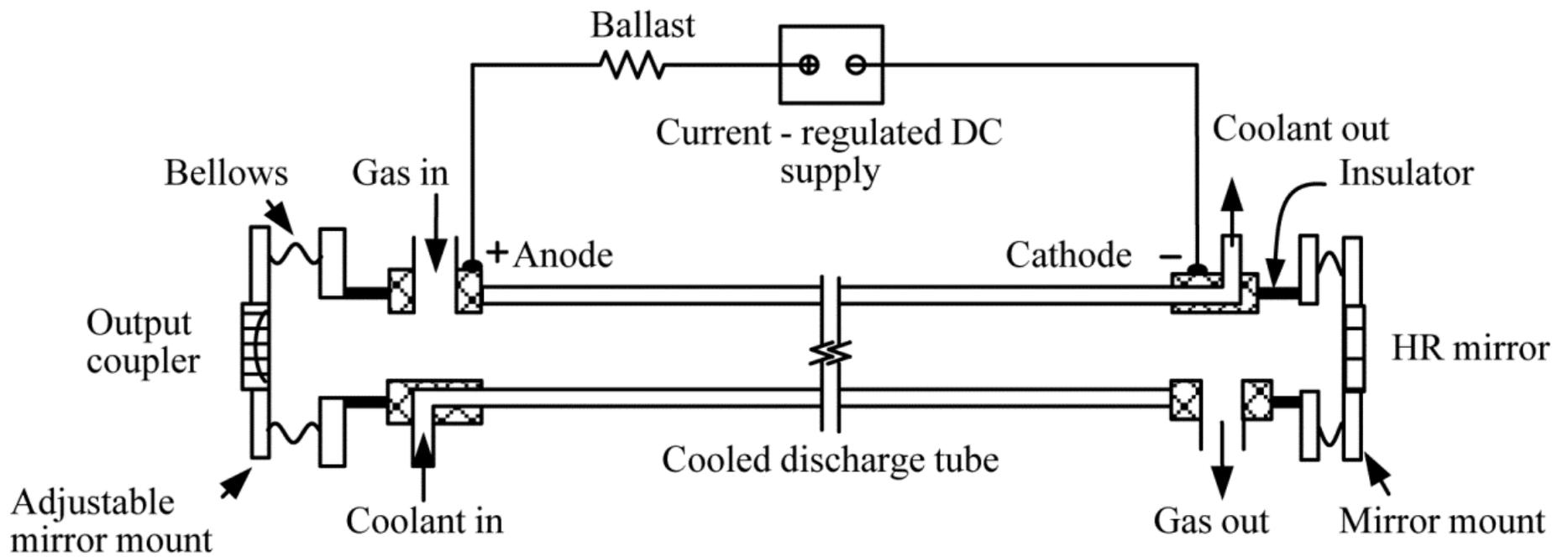
**Figure 4-2** *Vibrational and rotational energy levels in a diatomic molecule (levels not to same scale)*



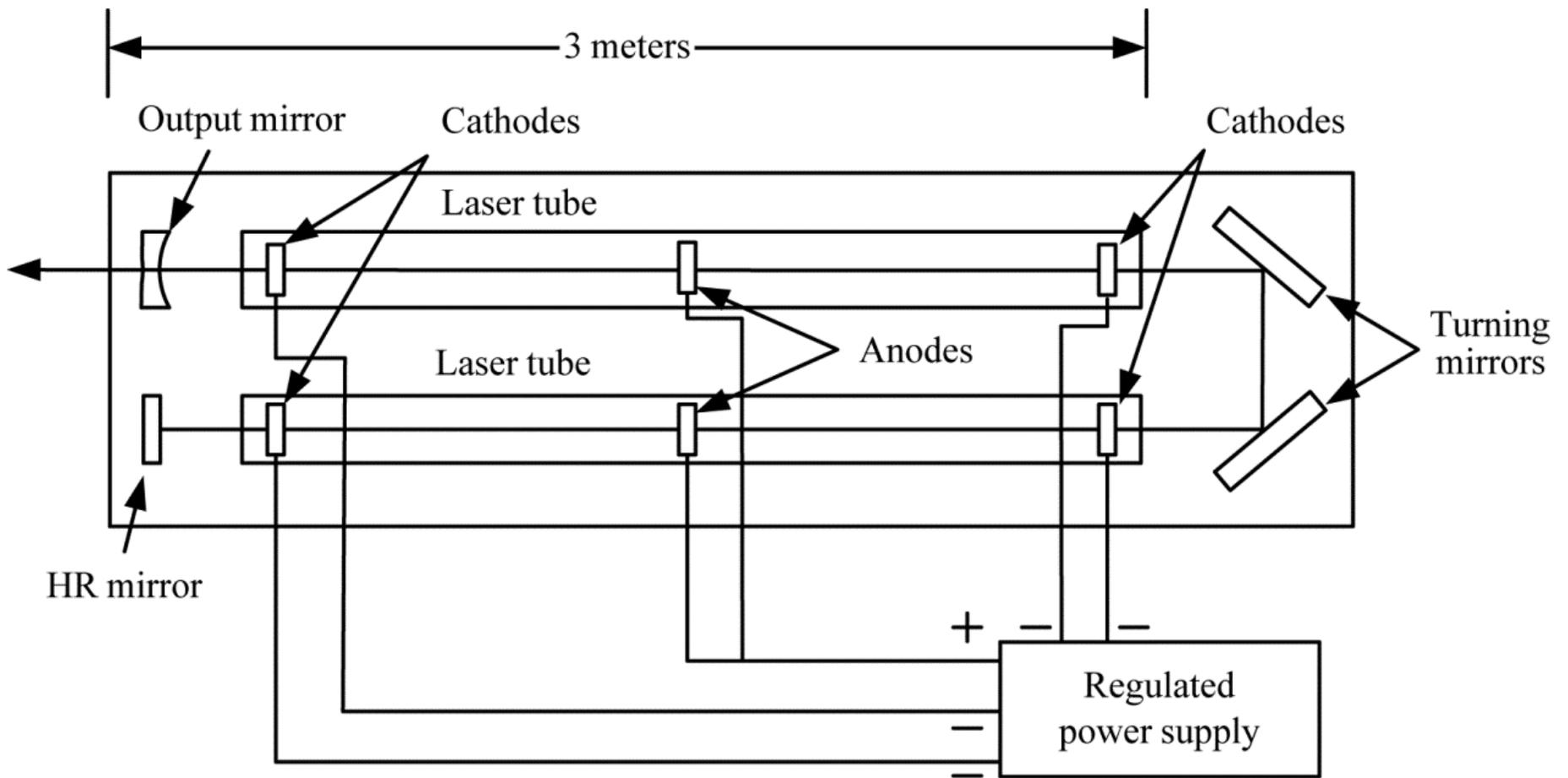
**Figure 4-3** *Normal modes of vibration for CO<sub>2</sub> molecules*



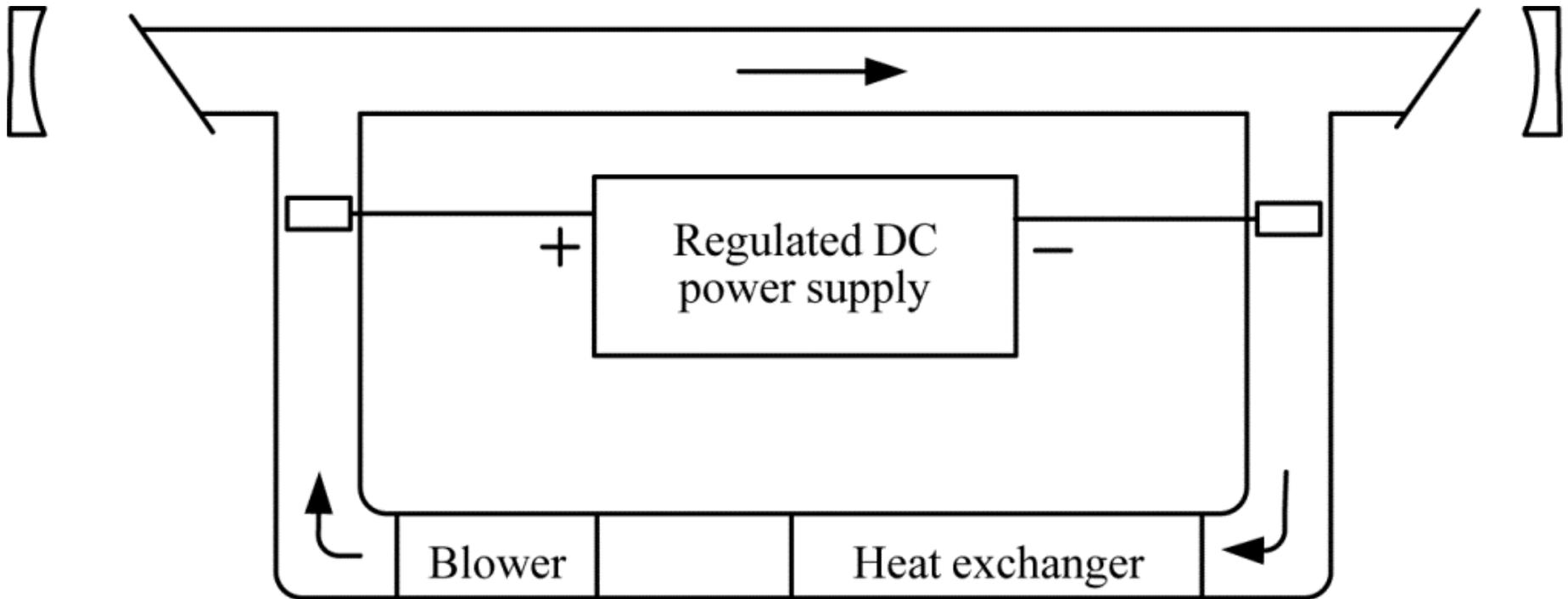
**Figure 4-4** *Simplified energy-level diagram for CO<sub>2</sub> laser showing vibrational energy transfer*



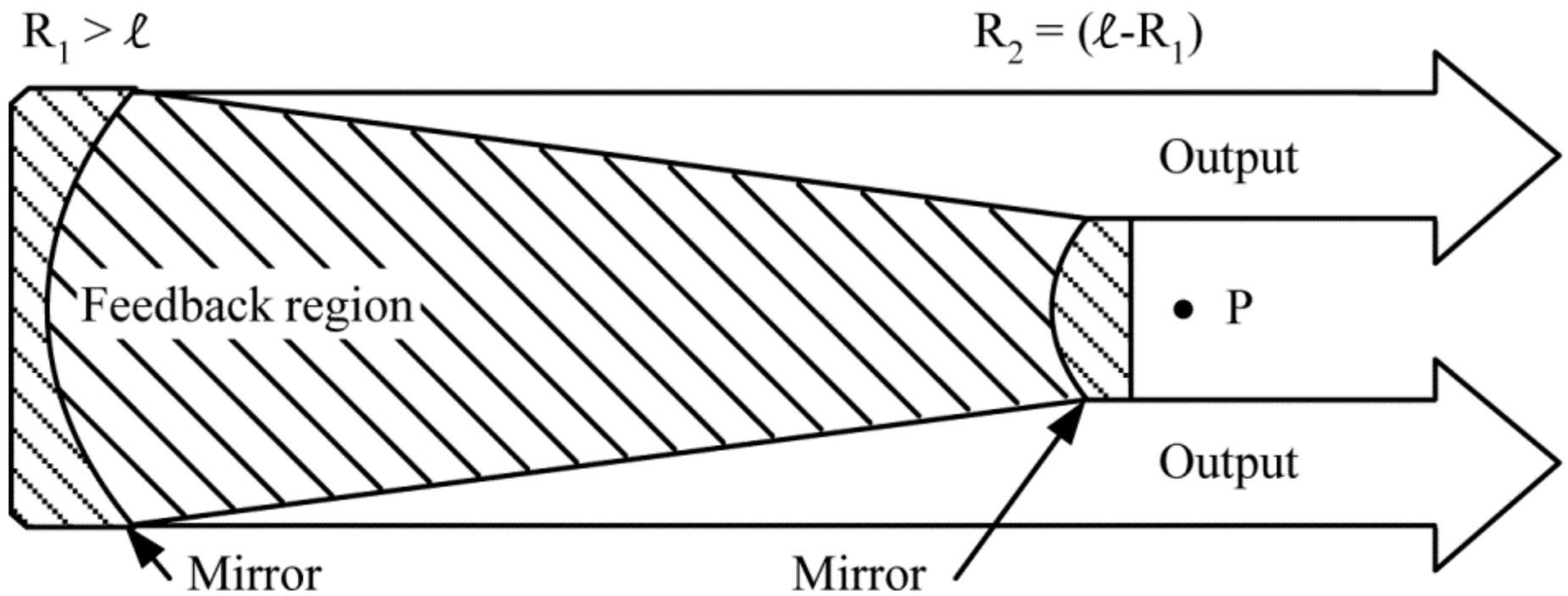
**Figure 4-5** *Simple coaxial flowing CO<sub>2</sub> laser*



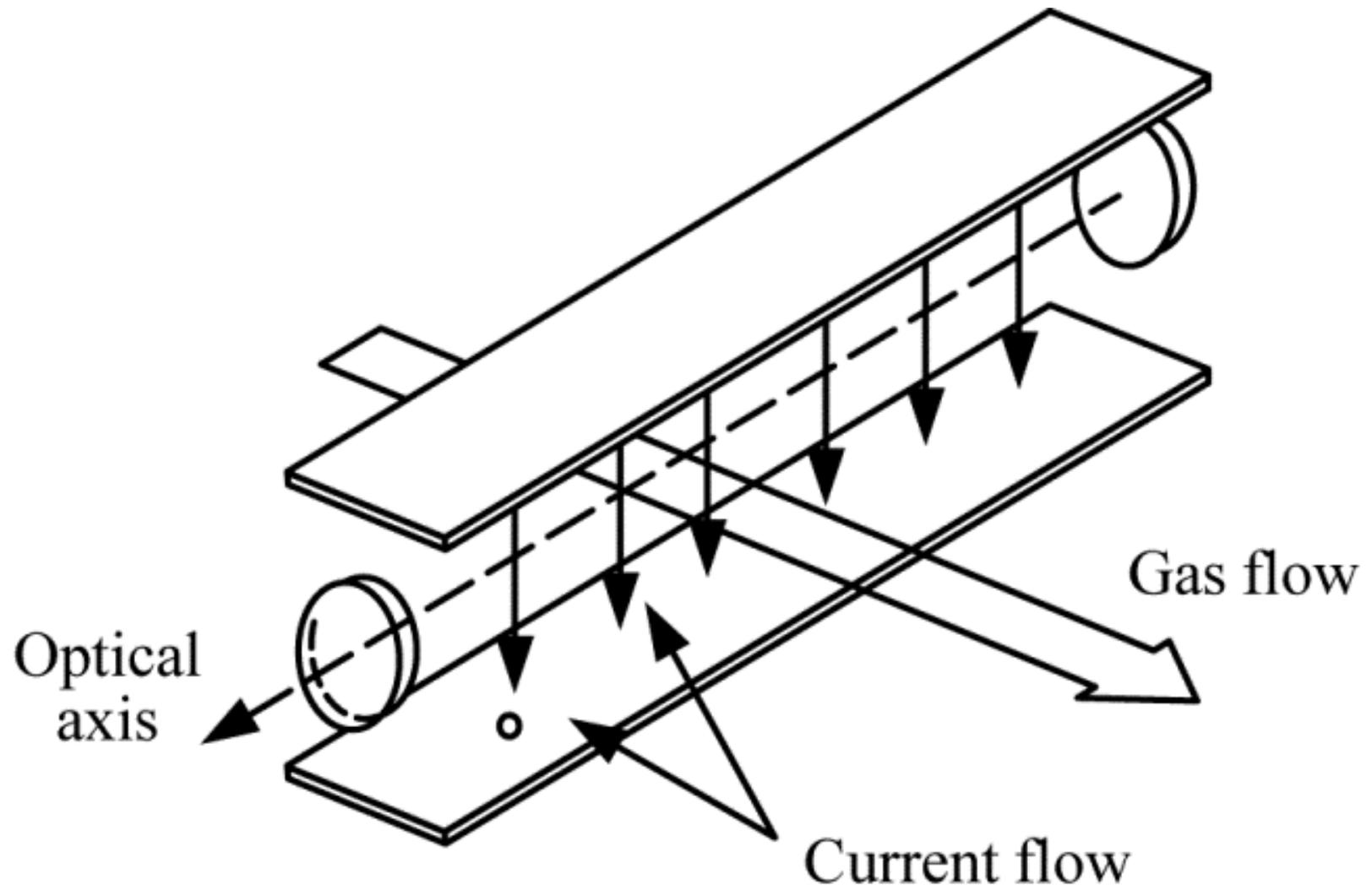
**Figure 4-6** *Optical and electrical system of 250 W CO<sub>2</sub> laser (overall length of laser head=3m)*



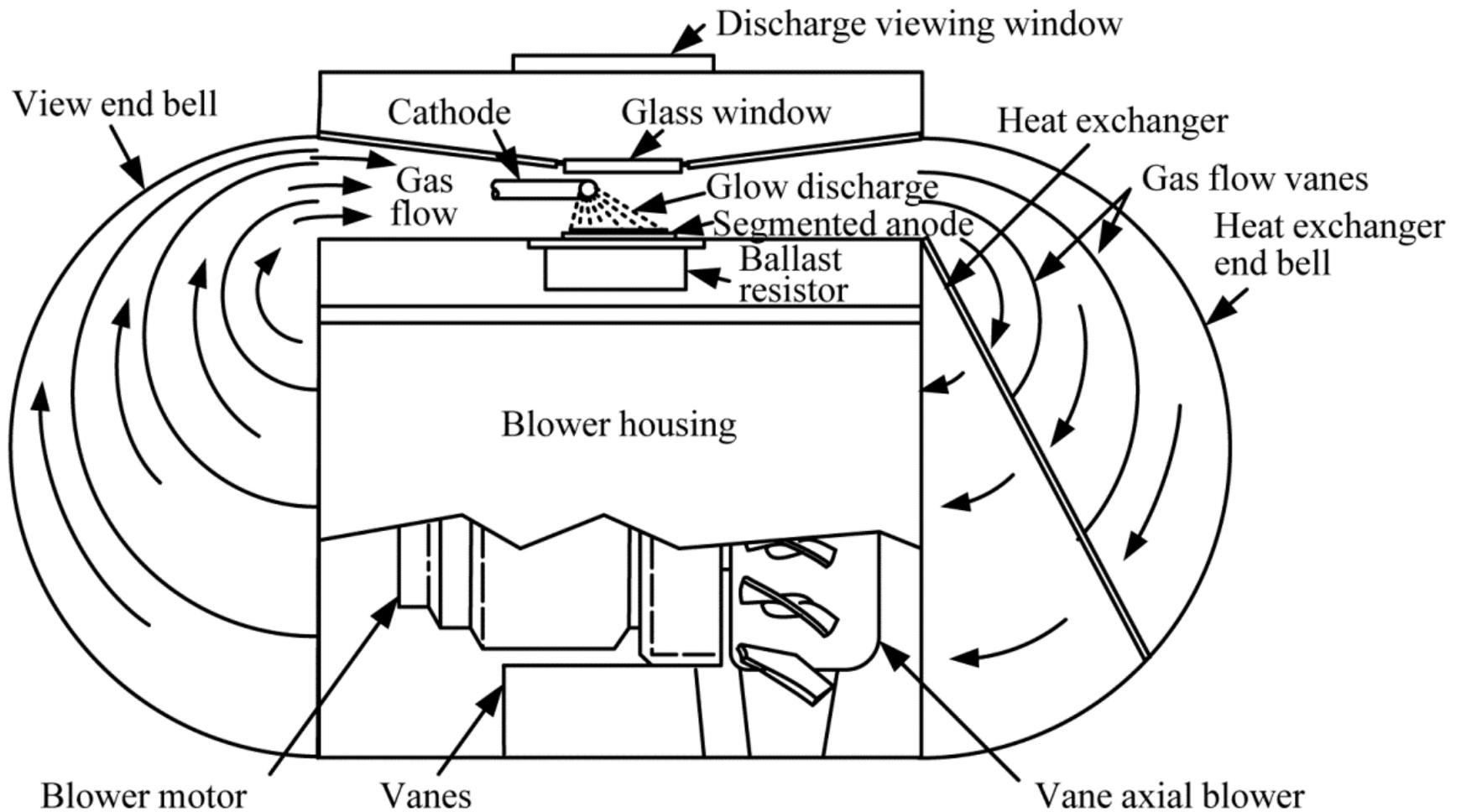
**Figure 4-7** *Fast axial flow CW CO<sub>2</sub> laser*



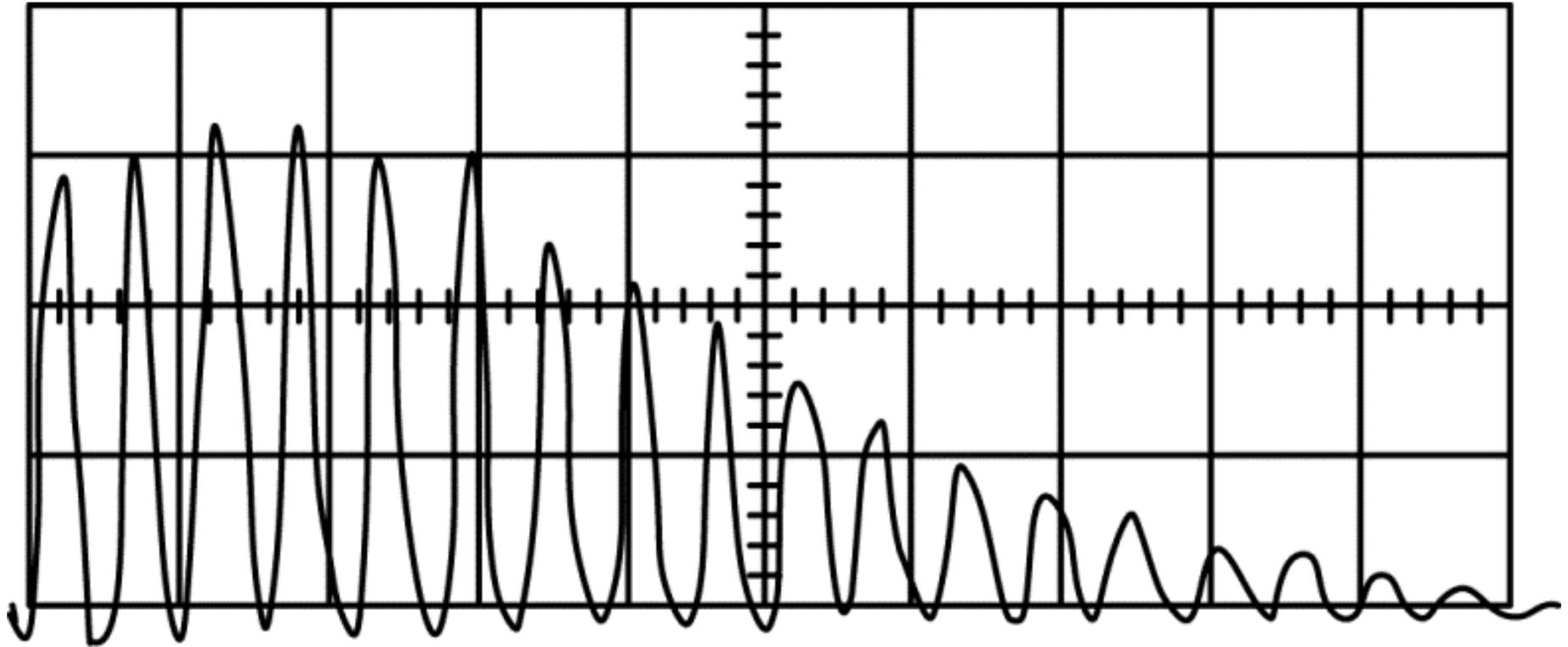
**Figure 4-8** *Unstable resonator*



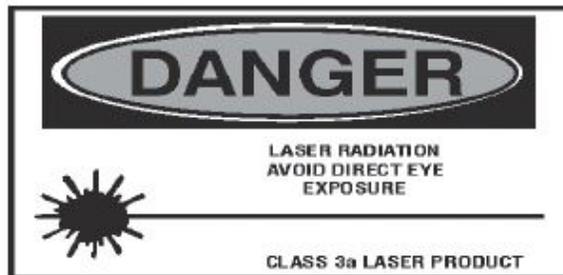
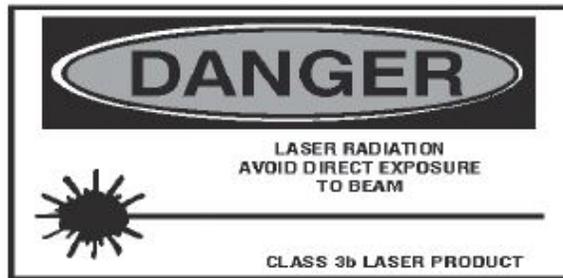
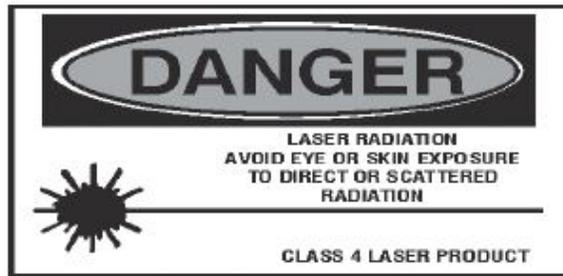
**Figure 4-9** *Traverse flow CW CO<sub>2</sub> laser*



**Figure 4-10** *Typical configuration of a gas transport laser. The optical axis is perpendicular to the page*



**Figure 4-11** *Oscilloscope trace of mode-locked train of pulses from a CO<sub>2</sub> lasers, 200ns/division*



**Figure 4-12** *Laser area warning signs*