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Demonstration of a wavelength tuneable mid-IR molecular laser

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To our knowledge, we have demonstrated the first optically pumped tuneable HBr oscillator lasing on both the P- and the R-branches. Through the implementation of an intra-cavity diffractive grating, we could tune the wavelength over a range of 538 nm from 3872 nm to 4410 nm.

A single-frequency Ho:YLF ring laser and amplifier system was used as pump source. The oscillator was pumped in a double pass configuration with 50 mJ, 2064 nm pulses at a repetition rate of 50 Hz. The HBr was kept at 52 mBar, 20 degrees Celsius in a 510 mm tube.

The resonator cavity consisted of a flat output coupler mirror with a reflectivity of $R=80$

Lasing was demonstrated on eight lines of the P-branch with wavelengths ranging from 4102 nm to 4410 nm, and five lines of the R-branch ranging from 3872 nm to 3999 nm. The highest output energy for the given pump power was 1.1 mJ at 4131 nm.

**Level (Hons, MSc,
 PhD, other)?**

MSc

**Consider for a student
 award (Yes / No)?**

No

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

Yes

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