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Title:MEMS-plunger platform for tunable terahertz wire laser at  $\sim 5$  K

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Abstract: The tuning of a terahertz quantum cascade wire laser, operated at  $\sim 5$  K, is demonstrated using a micro-machined metal or silicon object, called a 'plunger', attached to a MEMS-based two-stage flexure and actuated by a differential micrometer through a piezo-actuator that is de-amplified by a lever system. The heterogeneous system including the plunger, made from a silicon-on-insulator wafer, and a wire laser based on GaAs/AlGaAs material with first-order distributed feedback corrugation, works at liquid helium temperature ( $\sim 5$  K). The double-stage flexure design enables a frictionless, reversible and continuous tuning over a broad range of  $\sim 330$  GHz ( $\sim 8.6\%$  of the 3.85 THz center frequency) with single-mode operation.

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