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Optically Pumped Lasing of Ar(4p→4s) Excited in Linear Microplasma Arrays at Atmospheric Pressure[1] WILSON RAWLINS, KRISTIN GALBALLY-KINNEY, STEVEN DAVIS, Physical Sciences Inc., Andover MA, ALAN HOSKINSON, JEFFREY HOPWOOD, Electrical and Computer Engineering Department, Tufts University, Medford MA — The optically pumped rare-gas metastable laser is a chemically inert analogue to alkali laser systems. These devices require efficient generation of electronically excited metastable atoms in a continuous-wave electric discharge in flowing gas mixtures at elevated pressure. Linear arrays of microstrip resonators are well suited for this task. We have observed CW optical gain and lasing at 912 nm using linear micro-discharge arrays to generate metastable rare-gas atoms at atmospheric pressure. Ar(4s) metastables are generated in flowing Ar/He mixtures by low-power, CW linear array microplasmas operating near 900 MHz and 1 atm. The metastables are optically excited to selected states in the Ar(4p) manifold by a tunable, CW Ti:S laser. Collisional energy transfer within the manifold produces a population inversion. The Ar(4s) concentration and the optical gain are probed by tunable diode laser spectroscopy.

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Wilson Rawlins
Physical Sciences Inc., Andover MA

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