

Abstract Submitted
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Collisional Processes in Alkali-Methane Gas Mixtures for Alkali Laser Development¹ ALINA GEARBA, PHILIP RICH, LUCY ZIMMERMAN, JEREMIAH WELLS, JARED WESEMANN, BRIAN PATTERSON, RANDY KNIZE, JERRY SELL, U.S. Air Force Academy, STEPHEN SPICKLEMIRE, University of Indianapolis — A diode pumped alkali laser is a new class of optically pumped lasers whose active medium is an alkali vapor such as potassium, rubidium or cesium. An alkali vapor laser has the capability to produce highly coherent beams in a very efficient manner, and the possibility of scaling to high powers makes these lasers of interest in a variety of applications. The operation of an alkali laser relies on efficient excitation transfer between fine-structure levels of the alkali in the presence of a buffer gas. Quenching from these levels is also important as this causes unwanted heating in the laser medium which leads to a reduction in laser efficiency. We will present new precision measurements of the mixing and quenching cross sections for Rb($5P$) and Cs($6P$) in the presence of methane buffer gas. These results represent a significant increase in precision compared to previous work, and resolve a discrepancy in previous quenching measurements.

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