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Efficient and Selective Photon Detection using Amplification Without Inversion[1] KEVIN MERTES, MICHAEL DI ROSA, Los Alamos National Laboratory, C-PCS TEAM — We describe ongoing theoretical and experimental research at Los Alamos National Laboratory of a new technology for photon detection that exploits quantum processes to attain an unrivaled combination of high quantum efficiency and sharp spectral discrimination. The amplification without inversion (AWI) scheme we are exploring consists of a lambda system found in the excited states of Hg-202. The construction of such a detector requires locking lasers to excited state transitions in Hg-202. We demonstrate how to use saturated absorption spectroscopy and a simple-to-build discharge cell to achieve this. We also describe the theoretical and experimental results obtained to date using the detector. Funding is provided from the Laboratory Directed Research and Development program of the Los Alamos National Laboratory.

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