



Iranian Journal of Physics Research, Vol. 22, No. 1, 2022
DOI: 10.47176/ijpr.22.1.01325

Investigation of the temperature and magnetic field effect on the Cesium D1 atomic line filter characteristics

M Karami, S Golshan khavas, and F Sarreshtedari*

Magnetic resonance research laboratory, Department of Physics, College of science, University of Tehran, Tehran, Iran

E-mail: f.sarreshtedari@ut.ac.ir

(Received 3 October 2021 ; in final form 8 November 2021)

Abstract

Atomic spectral line filter is a narrow band pass optical filter which has many applications in quantum and laser systems. By engineering the system parameters like gas temperature and intensity of magnetic field, the filter with desired characteristics could be obtained. In this work, an atomic spectral line filter for Cesium D1 line (894.6nm) is implemented and characterized. The effect of system parameters on the filter transmission and its bandwidth is investigated. It is observed that by applying a magnetic field of 390 Gauss and adjusting the gas cell temperature on 40°C, a single peak filter with maximum filter transmission and FWHM of 0.24 GHz could be obtained.

Keywords: atomic line filter, Cesium D1 transition line, Faraday effect, atomic absorption spectroscopy

For full article, refer to the Persian section