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FINDING THE NUMBER DENSITY OF ATOMIC VAPOR BY STUDYING ITS ABSORPTION PROFILE

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We demonstrate a technique for obtaining the density of atomic vapor, by doing a fit of the resonant absorption spectrum to a density-matrix model. In order to demonstrate the usefulness of the technique, we apply it to absorption in the D_2 line of a Cs vapor cell at room temperature. The lineshape of the spectrum is asymmetric due to the role of open transitions. This asymmetry is explained in the model using transit-time relaxation as the atoms traverse the laser beam. We also obtain the latent heat of evaporation by studying the number density as a function of temperature close to room temperature.