ATOMIC ABSORPTION PROFILES ASSOCIATED WITH PULSED EXCITATION

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S u m m a r y

The spectral width of an atomic absorption line, observed with a steady (cw) coherent light source, typically increases in proportion to the square root of the light intensity, an effect known as the power broadening. We show that such an excitation, as monitored by the fluorescence signal, differs qualitatively when the excitation is pulsed. We consider the variation of the fluorescence (summed over all frequencies) with the frequency of an excitation-producing laser and show that the associated excitation profile contains two components: a power-broadened one and a narrow line, whose width depends mainly on the natural width and only very weakly on the laser intensity. Unlike the signal produced with photoionization with a continuous ionization field [Halfmann *et al.*, Opt. Commun. **220**, 353 (2003)], the width of the narrow line does not depend on the pulse duration.