UM-SJTU JOINT INSTITUTE
Advanced Lasers and Optics Laboratory
(VE438)

Post Lab Assignment

LAB 6
Acoustic-Optic Modulator

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1 Answers for Post Lab Questions

1.1 (a)

$f_{laser} = \frac{c}{\lambda} = \frac{3\times10^8}{632.8\times10^{-9}} = 4.74 \times 10^{14}\text{Hz}$
$f' = f_{laser} \pm f_{RF} = 4.74 \times 10^{14} \pm 10^8\text{Hz}$
$2\theta = \frac{\lambda_{light} f_{RF}}{v_{sound}}$
$v_{sound} = \frac{\lambda_{light} f_{RF}}{\theta} = \frac{632.8\times10^{-9}*10^8}{0.25^o} = 252.8(m/s)$

1.2 (b)

Since the light is perpendicular to the direction of propagation of the sound, the sound causes a moving grating with period equals to the wavelength of sound in one plane. Then the grating can cause many orders of diffraction patterns which are symmetric to the zero order pattern.