

22. Since we are considering the *diameter* of the central diffraction maximum, then we are working with *twice* the Rayleigh angle. Using notation similar to that in Sample Problem 37-6 (which is in the textbook supplement), we have  $2(1.22\lambda/d) = D/L$ . Therefore,

$$d = 2 \frac{1.22\lambda L}{D} = 2 \frac{(1.22)(500 \times 10^{-9} \text{ m})(3.54 \times 10^5 \text{ m})}{9.1 \text{ m}} = 0.047 \text{ m} .$$