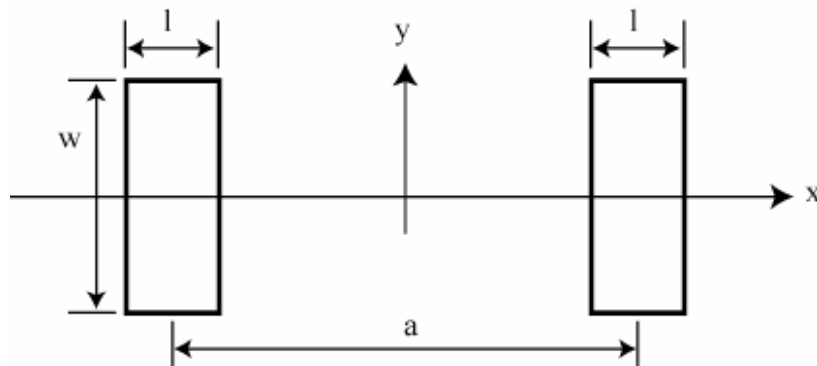


**ECEn 462 (Block 1)**  
**Electromagnetic Radiation and Propagation**  
Homework #7

1. A human eye has an iris opening of approximately 2 mm in diameter. At the wavelength of yellow light (580 nm), what is the resolution of the human eye (in degrees)? For simplicity, assume the opening is square, 2mm on a side, and the resolution is the angle between the visual axis and the first null.
  
2. A uniformly illuminated square aperture antenna 1 m on a side has an electric field strength in the aperture of 10 V/m at 30 GHz.
  - a. Sketch the resulting antenna pattern and give a quantitative value for its half-power beamwidth (in degrees).
  - b. What is the far-field electric field strength on the main axis at a distance of 10 km from the aperture?
  - c. If a 10 cm square in the center of the 1-m uniformly illuminated aperture were obstructed.
  
3. What is the far field electric field for the double slit aperture illustrated in Figure 1? Each slit has a width  $w$  and a length  $l$ , and the slits are separated by a distance  $a$ . What happens if there are  $N$  slits instead of just 2?



**Figure 1**