tive reduction of transmission is localized to the patch $0 \leq \theta \leq 45°$ around the resonant wavenumber, except for regions of strong reflection at large angles of incidence.

4.2 Reflection from arrays of semicircular bars

Construction of an artificial bar field which mimics the reflective behavior of a patch of sinusoidal bars will likely involve the placement of several discrete structures whose longitudinal axes run parallel to shore and whose on-offshore spacing is controlled. In this section, we look at several examples of bar fields consisting of rows of semicircular structures placed on an otherwise flat bottom. The case of bars placed on a sloping bottom is left to the next section.

For a given run, all bars are assumed to have the same radius r; $\delta(x)$ for x in the interval of a bar location is then given by

$$\delta(x) = [r^2 - |x - x_b|^2]^{1/2} \tag{50}$$

where x_b is the bar center location. We first test a regularly spaced field of 4 bars with a spacing of 1 m and a water depth of $h = 0.15625m$. We take $r = 0.05m$. This case thus mimics the sinusoidal geometry for Figure 2, with bar crests having the same spacing and the same vertical projection above the horizontal bottom. Results are shown in Figure 5, where we retain the same definition for λ as in the previous section.

The results for the field of semicircular bars exhibit several interesting features. The reflection peak at $2k/\lambda = 1$ is still present and represents the Bragg-interaction of the wave train with the fundamental spacing of the bar field. A second, stronger peak is present at $2k/\lambda = 2$ and represents the Bragg interaction of the wave train with the first superharmonic spacing of the bar field. These results need to be interpreted in light of the Fourier transform of the constructed depth profile. The basic periodic interval for the transform analysis is indicated in Figure 6a, and the FFT amplitude spectrum corresponding to the interval is shown in Figure 6b. The spectrum of the bottom drops off quite slowly above the fundamental component, which would be the only component present in an ideal