Focusing by plano-concave lens using negative refraction

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eastern University, Boston, MA. — We demonstrate experimentally focusing of
plane waves at microwave frequencies by a plano-concave lens using negative refrac-
tion. The lens was fabricated from a microwave dielectric photonic crystal acting
as a left-handed metamaterial. The inverse experiment where the source is placed
at the observed focal point was also performed and shows clearly an emerging plane
wave. The focal point is observed to move with the radius of curvature of the lens.
Different radii of curvature have different frequency ranges of focusing all of which
lie in the second band frequencies along Γ-X propagation direction of the photonic
crystal. The measured values of refractive index are in complete agreement with
those determined from band structure calculations. Work supported by AFOSR
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