

Negative Group Velocity and Spin-Flip in Microwave Adaptors

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A Fabry-Perot like interferometer with two microwaveguide adaptors as reflectors creates a passive dielectric medium with a negative group delay time due to polarization shift. A rotational strain of the polarization vector by one of the adaptors is coupled with a drastic negative group velocity. The adapted rectangular and circular waveguides have the same dispersion. The input rectangular waveguide mode is linearly polarized, whereas the basic mode of the adapted circular waveguide is circularly polarized. A 667 wavelengths long circular waveguide connects the input with the output adaptor. Experiments are performed in the frequency and in the time domain. We describe, how the helical polarization change and the spin-flip of the two different circular wave modes produce the observed negative group velocity.

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