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EFFECT OF NON-FOURIER BOUNDARY CONDITION ON 3-OMEGA METHOD FOR THERMAL CONDUCTIVITY MEASUREMENT

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SUMMARY: We have examined the effect of non Fourier boundary condition on the 3-omega method for measuring the thermal conductivity using hyperbolic heat conduction equation and Fourier equation. The error in the temperature oscillations predicted by using Fourier boundary condition with Fourier equation can be up to 85 % when compared to the temperature oscillations obtained using non Fourier boundary condition with hyperbolic heat conduction equation and up to 80% when compared to the temperature amplitudes obtained using non Fourier boundary condition with Fourier equation. We observe that the solution of Fourier equation with Fourier boundary condition underestimates the thermal conductivity whereas the solution obtained using Fourier boundary condition with the hyperbolic heat conduction equation would overestimate the thermal conductivity.