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Experimental Linear and Nonlinear Gaster Wave Packets*
L.M. MACK and J.M. KENDALL, Jet. Propulsion 1 laboratory, Calif. Inst. of Technology. --- In a series of experiments, Kendall has studied the random wave packets produced by freestream turbulence. A flat plate instrumented with 64 subsu face microphones and a movable hot wire was used to gather the data. 1 for validation]) of the instrumentation and computer prop, rams, synchronized Gaster wave packets were created at a concentrated source 30. S cm from the leading edge. With the hot wire placed at $U/U_1 = 0.20$, the data give the time history of the wave packet as a function of input amplitude as measured by both the hot wire and a nearby microphone. In addition, the 64 microphones give the time history of the packet over a substantial area. As the. input amplitude is increased, the packet al a fixed location changes from linear to nonlinear, with a shift of the power spectrum from a single peak at the local "1'S frequency to a spectrum with most of the energy at lower frequencies and the peak mar, but greater than, the subharmonic of the '1'S frequency. At the largest Reynolds number within the instrumented area of the plate, breakdown to turbulence does not occur at the. packet, but at a feature located downstream of the packet that is associated with the transient created at the source at high amplitudes. The packet itself remains laminar.
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