

XI. PHYSICAL ACOUSTICS

Academic Research Staff

Prof. K. U. Ingard

Graduate Students

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RESEARCH OBJECTIVES AND SUMMARY OF RESEARCH

U. S. Navy – Office of Naval Research (Contract N00014-67-A-0204-0019)

K. U. Ingard

Our research program in physical acoustics involves all aspects of sound waves in solids, liquids, gases, and plasmas, with the emphasis varying somewhat from year to year. Thus during one period the focus was on acoustically induced instabilities in plasmas, the interaction of sound with light in crystals and liquids, and the study of acoustic wave amplification by electric fields in semiconductors. At present, the emphasis is on aero-acoustics, in particular, on nonlinear aspects of sound propagation in gases, the generation of sound by turbulent flow, and acoustically induced flow instabilities. We have recently demonstrated experimentally the influence of relative motion between a sound source and the medium on sound emission characteristics, and in another project we have studied the effect of turbulence on the attenuation of sound.

Nonlinearity in acoustics arises from the nonlinearity of the medium itself, as well as from the nonlinearity of boundaries. The effect of the latter on sound transmission in ducts is being explored in some detail, and we are also investigating the role of superimposed mean flow.

