knock phenomena and the adiabatic process. To perform the data analysis a time-frequency spectral approach was used. The results revealed both radial and circumferential resonances. The most important adiabatic coefficients were carried out and used to calculate the heat release rate.

11:15

4aPA12. Sound attenuation in the critical region of the ionic binary mixture ethylammonium nitrate/*n*-octanol. Sirojiddin Z. Mirzaev (Heat Phys. Dept., Uzbek Acad. of Sci., Katartal 28, Tashkent 700135, Uzbekistan) and Udo Kaatze (Drittes Physikalisches Institut, Georg-August-Universitaet, 37073 Goettingen, Germany)

Ultrasonic attenuation spectra (100 kHz $<f<$ 4 MHz) of the ionic mixture ethylammonium nitrate/*n*-octanol of critical composition and also of the ethylammonium nitrate itself (100 kHz $<f<$ 400 MHz) are discussed at different temperatures. The measured spectra are evaluated in terms of the Bhattacharjee–Ferrell dynamic scaling theory. Using literature data for the amplitude of the fluctuation correlation length, the background and critical part of the heat capacity, the sonic attenuation spectrum as predicted by the Bhattacharjee-Ferrell model has been calculated for the critical mixture at the critical temperature. Again following this theoretical model, the contribution due to concentration fluctuations has been subtracted from the measured spectra at the temperatures of measurement and also subtracted has been the high-frequency asymptotic background contribution. The measured data are consistent with the Bhattacharjee–Ferrell theory of critical concentration fluctuations but show an additional frequency dependence. [Work supported by the Volkswagen-Stiftung, Hannover, Germany.]

11:30

4aPA13. Results of attenuation calculations for a three-component gas mixture. Yefim Dain and Richard M. Lueptow (Dept. of Mech. Eng., Northwestern Univ., 2145 Sheridan Rd., Evanston, IL 60208, r-lueptow@northwestern.edu)

Acoustic attenuation in a mixture of gases results from the combined effects of molecular relaxation and the classical mechanisms of viscosity and heat conduction. As a result, the attenuation depends on the composition of the gas, frequency, temperature, and pressure. A model of the relaxational attenuation that permits the prediction of acoustic attenuation is used to predict the effect of composition, frequency, temperature, and pressure on the acoustic attenuation in a three-component gas mixture of nitrogen, methane, and water vapor. The attenuation spectrum is dependent upon the composition through the appearance of peaks in the spectrum related to the relaxation frequency of the particular components and their relaxing complexes. The relaxation peak related to methane dominates the spectrum except at low methane concentrations, where the nitrogen peak, which is dependent upon the water vapor concentration, is evident. Temperature and pressure significantly alter the relaxation frequency and the degree of attenuation, but water vapor plays little role in the attenuation at moderate and high methane concentrations. [This work was funded by the Department of Energy under subcontract from Commercial Electronics, Inc. (Broken Arrow, OK) and by the Ford Motor Company.]

11:45

4aPA14. A study of simulation methods of limited diffraction beams. Hu Peng, Zuosheng Zhang (Univ. of Sci. Tech. China, Hefei, PROC 230026), and Jian-yu Lu (Univ. of Toledo, Toledo, OH 43606)

Limited diffraction beams such as Bessel beams and *X* waves have been studied extensively because of their potential applications in many areas such as medical imaging and optical communications. Computer simulations have been powerful tools for understanding the fundamentals of these beams. In this study, limited diffraction beams, specifically, Bessel beams and *X* waves, were simulated. The simulations were based on the frequency-domain method (Rayleigh–Sommerfeld diffraction formula), time-domain method, and finite-element or finite-difference method. For Bessel beams, a circular transducer divided into multiple rings was assumed. For pressure distributions on axial axis, the simulations were simplified due to the symmetry. In the case of *X* waves, the differential property of acoustic waves was used. The results of the simulation methods were compared with each other. Advantages and disadvantages of these methods will be reported. In all cases, the results are very close to those predicted by theory. [This work was supported in part by Grant HL 60301 from the National Institute of Health of the U.S.A.]

THURSDAY MORNING, 7 DECEMBER 2000 CALIFORNIA SALON 2, 8:30 A.M. TO 12:00 NOON

Session 4aPP

Psychological and Physiological Acoustics: Pitch, Loudness and Localization

Kourosh Saberi, Chair

Department of Cognitive Sciences, University of California, Irvine, California 92697

Contributed Papers

8:30

4aPP1. Franssen à la phones. William M. Hartmann, Scott R. Lawton (Phys. and Astron., Michigan State Univ., East Lansing, MI 48824), and Brad Rakerd (Michigan State Univ.)

According to current explanation, the Franssen effect reflects a competition between localization cues from the onset of a tone and cues from the steady-state portion. For a sine tone in a room, the steady-state interaural time and level cues (ITD and ILD) are implausible because of room reflections. Therefore, onset cues dominate, and a listener localizes the tone at its onset position regardless of the true origin of the steady state. To test this explanation we used headphones to simulate the simplest kind of Franssen stimulus: The ITD was fixed throughout the tone. At onset, the ILD was zero. After onset, the ILD grew so as to contradict the ITD in the steady state. Equal numbers of trials were done with abrupt and slow onsets. The listener's task was to localize the steady-state part of the tone. A Franssen analog was identified by comparing responses to abrupt-onset and slow-onset tones. Results were compared with the standard Franssen effect in a large room. Clear evidence of a Franssen effect, with its dependence on plausibility, appeared in the headphones experiments, but the data were less dramatic than data obtained in the room. [Work supported by the NIDCD.]

The Journal of the Acoustical Society of America

Vol. 108, No. 5, Pt. 2 of 2, November 2000 http://asa.aip.org

Acoustical Society of America

Institute of Noise Control Engineering

Program of the 140th Meeting

NOISE-CON 2000

Newport Beach Marriott Hotel
Newport Beach, California
3–8 December 2000

Table of Contents on p. A5

Published by the Acoustical Society of America through the American Institute of Physics