values of *Ksi*, and the second ones in the negative *k* values of *Ksi*. The modulus of *Ksi* is maximum each time that the resonant condition is encountered [ω so that $K'(\omega)$ is integer]. As new results, the k cut of Ksi reveals the Sommerfeld Watson aspect of the problem and SWAM identify the complex *K*. On an ω cut of *Ksi*, SWAM identify the RST aspect of the target (and a little more): complex frequency resonances $\Omega=\Omega' + j\Omega''$ for real modes *n*. SWAM is performed on experimental datas and on numerical form functions. The agreement with theoretical results obtained by RST is very good.

3:35

2pUW16. New experimental characterization of a resonance: Identification of the mode number using the Argand diagram and the GTD approach. Serge Derible, Jean-Marc Conoir, Jean-Louis Izbicki, and Pascal Rembert (LAUE, Universite du Havre, Pl. R. Schuman, 76610 Le Havre, France)

Until now, the mode n of vibration of an immersed cylindrical shell, associated to the reemission of a peripheral wave, using an incident quasi-monochromatic plane wave is performed by carrying out the method of isolation and identification of resonance. The new method proposed here involves only the FFT of the whole pressure signal backscattered at normal incidence by the shell, normalized using the FFT of the incident wideband signal. At a resonance frequency, corresponding to an unknown value of n, the background phase φ_{exp} is measured from the Argand diagram of the scattered pressure. It corresponds to the argument of the pressure at the resonance frequency. The geometrical theory of diffraction allows us to connect the background phase φ_{GTD} to the mode number n. This mode is then deduced by minimizing the difference between φ_{exp} and φ_{GTD}. Experiments are carried out for *A* and S_0 resonances. Then, with a single backscattered signal, it is possible to obtain the frequency, the width, and the mode of the resonance.

3:40

2pUW17. Scholte wave dispersion by rippled liquid/solid interface topography. Jacques R. Chamuel (Sonoquest Adv. Ultrason. Res., P.O. Box 81153, Wellesley Hills, MA 02181-0001)

The effect of sand ripples on seismoacoustic waves is not yet understood. Quantitative results are presented characterizing the dispersion of Scholte waves propagating along a rippled surface of an immersed ''soft'' solid half-space. One model has a sinusoidal profile with a ratio of corrugation amplitude to wavelength of 0.25. The observed Bragg frequency components of broadband transient received waveforms are shifted by 180° as the receiver is displaced one cycle along the corrugation, however, the other frequency components are delayed by a smaller amount following the dispersion characteristics. Scholte and Rayleigh wave experimental dispersion graphs obtained from ''soft'' solid models are compared with replotted scaled numerical results on Rayleigh wave dispersion along a ''hard'' corrugated solid half-space [Glass *et al.*, ''Propagation of Rayleigh surface waves across a large-amplitude grating,'' Phys. Rev. B **24**, 6843–6861 (1981)]. The findings reveal that a rippled ''soft'' liquid/solid interface can decrease the velocity by more than 70% of high-frequency Scholte wave components propagating normal to the ripples. The accuracy of acoustic inversion and detection of buried objects depends on predicting the effect of seafloor topography. [Work supported by ONR.]

3:45

2pUW18. Scatterer depth estimation using broadband active matched field processing. Brian K. Jennison (Loyola College, Dept. of Elec. Eng., 4501 N. Charles St., Baltimore, MD 21210-2699), C. Allan Boyles, and Kevin J. McCann (Johns Hopkins Univ., Laurel, MD 20723-6099)

The reduction of false alarms caused by boundary reverberation is one of the major challenges confronting active acoustic systems used for antisubmarine warfare. Scatterer depth serves as a powerful discriminant for distinguishing false target echoes reflecting from the surface or the bottom from actual targets located within the water column. Active matched field processing provides a technique for estimating the scatterer depth by comparing the measured acoustic data with a series of modeled replicas generated assuming different scatterer depths. This paper considers active matched field processing to estimate the depth of a scatterer (range is assumed known from the delay time of the echo) using a single receive hydrophone. Since matched field processing is sensitive to environmental mismatch, the search space is expanded to include both the scatterer depth and the unknown environmental parameters. Simulated annealing is used to efficiently search the parameter space for the optimal solution. A novel cost function, based solely on multipath arrival times rather than the relative multipath amplitudes, is introduced to make the search robust to uncertainties in scatter characteristics. Simulation results demonstrate the effectiveness of the technique to accurately estimate scatterer depth with limited environmental data.

3:50

2pUW19. The detection of cylindrical objects of low acoustic contrast buried in the seabed. Ruthven C. Evans and Timothy G. Leighton (Inst. of Sound and Vib. Res., Univ. of Southampton, Highfield, Southampton SO17 1BJ, UK, ecpr@isvr.soton.ac.uk)

It is anticipated that the next generation of submarine fiber-optic telecommunications cables will be invisible to present-day detection systems. In cooperation with Cable and Wireless (Marine) Ltd., research has been conducted into the remote detection of buried objects of low acoustic contrast, with particular emphasis given to the detection of buried cables. Specifically, this has concerned the design of a detection system that can reliably discriminate a small diameter (cm scale), cylindrical target buried to a depth of up to 1 m below the seabed from a range of 1 m above. A purpose-built, laboratory-scale, automated sensing system comprising a bistatic arrangement of adjustable, focused transducers is described. This apparatus has been used successfully in the high-resolution imaging of a range of buried objects, proving an acoustic detection system to be a feasible solution. Recent experimental investigations have focused on two areas: Waveform optimization techniques, to maximize seabed penetration and target interaction, and matched filtering and clutter reduction techniques, to optimize the detection system to the acoustic signature of a particular buried object. Results are presented.

3:55

2pUW20. Characteristic of a semiburied object in shallow water. Shi-e Yang and Xiukun Li (Dept. of Underwater Acoust. Eng., Harbin Eng. Univ., 150001 Harbin, PROC)

The impulse reflection of a semiburied object is strongly complicated due to a multipath channel effect in a shallow-water environment, and usually also mixed with unavoidable bottom reverberation. An efficient method of signal processing in order to obtain necessary characteristics of the object, which can be used for object identification, is discussed, and several experimental examples are given.