ia ink and prepared for histology

ntional spectral analyses on individ-
t Hamming window, 1 point shift).
rmalized by corresponding spectra
ollowing region of interest (ROI) se-
ge IBS for each ROI was determined
comparison, the average gray scale
ical images of the specimen and ref-
ips-ATL). Linear GS values from
hantom and then converted to deci-

were 12.7 ± 0.7, 6.5 ± 0.2, 3.4 ± 0.4
5, +3 and -3 dB, respectively. Com-
arotid plaque specimens found IBS
rrelated to plaque content assessed
es between different plaque types
at both IBS and GS parametric im-
tentially useful for *in vivo* charac-

ll for ultrasonic brain imaging,
M. Fink, *Laboratoire Ondes et*
.S 1503, 10 rue Vauquelin 75231

pendent on the focusing quality of
l strongly degrades the ultrasonic
e aberrations of the wavefront. In
en partially corrected by coupling
sation of the emission signals. In
0 dB, but the sidelobes level re-

e spatio-temporal inverse filter,
gation. Experiments will be pre-
mental focusing through the skull
medium. In the transmit-receive
level obtained in water down to
els) and thus could lead to high
ever, this focusing can only be
ely different temporal shapes on
at potential of such completely

128 array, Anna T. Fernandez
ing, Duke University, Durham,

A number of studies have demonstrated the necessity of 1.75-D or 2-D arrays for successful measurement of tissue-induced image degradations, evaluation and implementation of adaptive imaging algorithms. Meaningful *in vivo* measurements require fine spacing of array elements, excellent element uniformity and rapid acquisition of individual channel rf echo data. We have constructed such a system.

We have a 1.75D, 8 x 128 array (Tetrad Corporation, Englewood, Co) that is integrated to the Siemens Elegra Scanner via a multiplexer controller. This array operates at 6.7 MHz center frequency, 50% bandwidth and can be used to rapidly collect single channel rf data. The array has a 26 mm x 12 mm footprint over which we can measure 2-dimensional aberration profiles. We can then apply phase aberration correction algorithms to correct for the aberrations on the received signals. The resulting 'corrected' image should show improved image quality.

Individual channel rf data was collected on 1-D and 2-D aberration layers placed between the transducer and spherical lesion phantom surface. Adaptive imaging is used to examine several different phase aberration correction algorithms. We will present these results and evaluate their performance based on improvements in image quality factors from the corrected images.

This work is supported by the National Institutes of Health, Grant R01-CA43334 and a National Science Foundation Graduate Fellowship.

5.3 **Ultrasound pulse modeling and tuning with Fourier-Bessel method for an annular array**, Paul D. Fox, Jiqi Cheng and Jian-yu Lu, *Ultrasound Laboratory, Department of Bioengineering, The University of Toledo, Toledo, OH 43606.*

In this report, we describe new work developed on the modelling and tuning of pulsed annular arrays using limited diffraction beams. In the first part of the present work, we apply Fourier-Bessel series to the surface of a annular array transducer emitting a pulse, with the result that the emitted field may be described by a set of known limited diffraction Bessel beams over a frequency range within the transducer bandwidth. This modelling approach gives us two useful insights into the behavior and understanding of the emitted field; firstly, the propagation of the field at any given frequency is given directly in terms of a set of limited diffraction beams of known parameters. Secondly, the total pulsed field is then obtained directly as the sum of the known continuous wave subfields for any given pulsed transducer excitation. This combination results in a simple numerical procedure that provides both new insight and computational techniques for the evaluation of pulsed fields.

In the second part of the work, beamforming (tuning) is then performed by applying a recently-developed least-squares limited diffraction quantization design to tune each emitted subfield as closely as possible to a corresponding desired subfield. These subfields are obtained by decomposing a given desired pulsed field into its component frequencies; in this way a tuned (pulsed) beamforming design is obtained as a sum of tuned continuous wave subfields. Results are given for the computation and tuning of pulsed X-wave and focussed Gaussian fields. These results are compared well with those obtained with the traditional Rayleigh-Sommerfeld diffraction formula. The conclusions drawn are that the method represents the first known application of limited diffraction beam theory to pulse field computation and tuning of an annular array in the context of medical imaging parameters.

This work was supported in part by the grant HL 60301 from the National Institute of Health.

5.4 **New method for angle correction of flow velocities in Doppler color sector images**, Ding-Yu Fei,[1] Deepak Rangaswami[1] and James A. Arrowood,[2] *Departments of [1]Bio-*

PROGRAM AND ABSTRACTS

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