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**Medical Image Processing using Transient Fourier Holography in Bacteriorhodopsin Films** SRI-RAJASEKHAR KOTHAPALLI, University of Massachusetts - Boston, PENGFEI WU, University of Massachusetts - Boston, CHANDRA YELLESWARAPU, University of Massachusetts - Boston, RAO DEVULAPALLI, University of Massachusetts - Boston — A real-time optical Fourier image processing system is demonstrated for early detection of microcalcifications in screen film as well as digital mammograms. The principle is based on recording and reconstructing the transient photoisomerizative grating formed in the bR film. At first Fourier hologram is recorded by spatially overlapping the Fourier transformed object beam with the reference beam in the bR film. Then the object beam is blocked and the reference beam performs the reconstruction of the recorded Fourier hologram. The optimum of diffraction efficiency occurs when object beam intensity is matched to the reference beam intensity. We exploit this technique to process mammograms in real-time for identification of microcalcifications buried in the soft tissue for early detection of breast cancer. A novel feature of the technique is the ability to transient display of selected spatial frequencies in the reconstructing process which enables the radiologists to study the features of interest in time scale.

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